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OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY.

INCORPORATING THE INDEX OF OTOLARYNGOLOGY.

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I.

THE ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY,

INCORPORATING THE

INDEX OF OTOLARYNGOLGY,

BY

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ST. LOUIS.

With this number, the consolidation of the ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY and the INDEX OF OTOLARYNGOLOGY is effected. The union of these two journals has been undertaken in order to combine within the compass of one journal the activities for which both were recognized and to permit the enlargement of its scope as the development of otolaryngology may demand.

Four leading departments will be maintained: 1. Original Articles; 2. Abstracts of Current Literature; 3. Reports of Society Proceedings; 4. Index of Current Literature.

It is the purpose of the Editorial Board to make these departments as complete in every detail as possible.

Each number, which will appear quarterly, will contain from 400 to 450 pages.

The ANNALS OF OPHTHALMOLOGY AND OTOLOGY was founded in 1892 by Dr. James Pleasant Parker, who continued in the active editorial management until his death in 1896. It was his devotion and untiring energy that brought the establishment of the journal to a successful issue and assured its future development and position.

In response to the diverging spheres of Ophthalmology and Otolaryngology, the journal was divided in 1897, and the two journals, the ANNALS OF OPHTHALMOLOGY and the ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY were established.

Dr. T. Melville Hardie became editor of the ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY, and continued in this capacity until 1898, when the editorial management was assumed by Dr. Hanau W. Loeb, who is the present incumbent.

The INDEX OF OTOLARYNGOLOGY was founded in 1913 by Dr. Joseph C. Beck, who has continued in its active management up to the present time.

The primary object which prompted the establishment of this journal was to bring the entire literature of Otolaryngology, including its borderlines, before the profession so as to make it available for reference and study. The feeling that this could be greatly extended in the merged journals is responsible for the combination.

II.

THE SURGERY OF THE TONGUE.*

By Joseph C. Beck, M. D.,

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In describing diseases of the tongue, particularly from the surgical aspect, the subject is divided anatomically into:

A. Surface of the tongue,

B. Substance of the tongue,

C. Base of the tongue,

D. Areas contiguous to the tongue.

While my purpose is to discuss the surgical portion of the symposium, it will be impossible not to mention at least some of the nonsurgical conditions and record three in particular which have thus far received little or no attention. I refer especially to

1. Chronic focal infection of the tongue.
2. X-ray burns of the tongue.
3. The tongue in acute lymphatic leukemia.

The more detailed description and management of these will be given in the case reports from my practice.

The tongue, belonging to the mouth or oral cavity, is subject to many local diseases as well as to manifestations of general diseases. It is easy to understand how infection may result in view of the fact that lies in this hotbed of pathogenic micro-organisms. Traumatism also occurs with great readiness.

The redeeming feature is the great healing power that is present in the oral cavity, due probably to the rich supply of blood and great formation of antibodies. Perhaps there is a natural acquired immunity present. This is only in cases of healthy individuals, because in the old or very young, as well as in anyone suffering from a chronic constitutional disease, the slightest infection about the tongue will be followed by

*Read before the Section of Laryngology, Otology and Rhinology at the sixty-eighth annual session of the American Medical Association, New York, June, 1917.

severe lesions. The teeth are probably more than any other structure in the neighborhood of the tongue the actual or predisposing cause of its disease. With respect to this lack or improper attention to these, until a recent date, is appalling.

Kronenberg found that in the earliest childhood only one-third of a large number of patients examined had good teeth, and this proportion became less with the increase of age. In other words, the older the individual, the worse the teeth. Kronenberg holds the members of the dental profession responsible, claiming that they are absolutely unqualified, owing to their lack of knowledge of pathology and surgical principles, to take care of the mouth in the human race, and that this applies equally to their attempt to look after the rest of the oral cavity, including the tongue.

TRAUMA OF TONGUE.

Biting the tongue occurs accidentally during a fall on the chin or during the act of chewing, as well as during an epileptic attack; it is usually of no consequence unless secondarily infected.

Ulcers of the side of the tongue due to jagged edges of carious teeth are most of the time superficial and heal promptly following attention to the teeth, but at times they are deep and infiltrated, with secondary enlargements of glands of the neck. The specific treatment for these ulcers is the application of a ten per cent iodoform paste. If the ulcer does not heal by the aid of this simple treatment, and if the border is somewhat infiltrated, an immediate excision of a particle of the tissue should be made and followed by microscopic examination, because it is well known that such ulcers are apt to develop into carcinoma. One of the most pernicious treatments of these ulcers is the employment of nitrate of silver, which delays the carcinoma to be absent and the ulcer persist after the simple proper diagnosis and treatment. If the examination shows treatment, it should be thoroughly curetted. Tuberculosis or rather lupus has been observed following injury to these ulcers.

Punctured wounds from forks, toothpicks or by the dentist during the process of treating the teeth, are responsible for a

fair number of traumatic conditions of the tongue, and these do not heal as readily as one would expect.

During the brushing of the teeth a bristle may lodge in the tongue and be followed by an infection, likewise a fish bone may become lodged, especially in the region of the circumvalate glands, and if not removed may lead to abscesses.

Decubital ulceration of the margins of the tongue from the teeth occurs in cases where the tongue appears to be larger than the space provided for it in the mouth, or from deformed teeth, especially when they are placed inwards. This also applies to bridges, artificial plates or orthodontia apparatus. Ulceration of the frenum of the tongue in the sucking child or during whooping cough, is a more frequent occurrence than is usually supposed. The simplest mild astringent treatment cures these conditions when the cause is removed. In the sucking child it is due to the frenum of the tongue coming in contact with the alveolar margin of the lower jaw and being allowed to remain there too long. In the adult these abrasions of the frenum linguæ have been seen following the forced pulling of the tongue in making a prolonged and forcible indirect laryngeal examination.

Other forms of trauma of the tongue are the burns, scalding and cauterizations. Eating very hot food will at times lead to superficial scalding of the tongue, and the blisters are usually not seen, since they burst very early and leave a white deposit. The papillæ are always prominent and the condition is very painful. In children the accident may occur as the result of placing the mouth to the steam escaping from a tea kettle; it often leads to severe scalding of the oral cavity, including the tongue. Too vigorous cleaning of the surface of the tongue, especially in infants, may lead to traumatic lesions. The pain is the most important symptom to combat, since people would rather not eat than suffer. The use of alypin, fifteen per cent solution, cocain and antipyrin solution, three to five per cent, or powdered anesthesin will suffice to anesthetize the surface so that the patient may eat without much pain. Some of the more severe burns occur in consequence of taking some concentrated acid or alkali either by mistake or intentionally in the attempt of suicide. As a rule there is a white appear-

ance of the surface of the tongue, but it depends somewhat on what substance was taken. For instance, the surface is brownish where chromic acid has been used. I have recently seen a burn of the tongue the like of which, so far as I know, has not been reported in literature. The condition which resulted from massive doses of radium will be described in detail in the case reports. The treatment of these severe burns of the tongue is of course usually overshadowed by the coincident necessary attention to the burns of the pharynx, esophagus or stomach. However, the immediate flushing of the oral cavity with great quantities of water, either acidulated or alkalin, depending on what was taken will be of service. After the surface ulcerates, the treatment is the same as any other simple ulcer.

Parasites in the tongue are infrequent, but trichina and echinococcus may be found.

Hemorrhages in and from the tongue are also comparatively rare, most of the bleeding from the mouth coming from the gums and teeth. However in scurvy and other blood dyscrasias, bleeding from the tongue or hematoma may be observed.

SKIN LESIONS.

In connection with urticaria there occurs frequently a swelling of the tongue that at times is enormous in size. It has been spoken of an angioneurotic or an anaphylactic reaction. I had such a case under my observation in which the larynx was also implicated and in which a fatal termination resulted from suffocation. (I shall describe this case in detail in my case reports, especially as to the dietary experiments.) While other parts of the mouth, pharynx and larynx may have simultaneous erythematous eruptions with those appearing on the skin as erythema nodosum, erythema exudativum, erythema multiforme, erythema bullosum, lupus erythematosis, such manifestations do not appear to occur on the tongue.

Recurrent herpes, however, forms on the tongue in connection with that of the skin, and, according to Seifert, it is the forerunner of a pemphigus, although Fournier believes they are an evidence of the socalled spontaneously cured lues. This form of herpes is constantly recurring and does not leave

any marked changes behind. Quite different is the form of herpes from infection in the intestine and the manifestation of toxins.

Herpes zoster has been found in the pharynx in close proximity to the base of the tongue, following the palatopharyngeal branch of the fifth nerve. De Havill and Hall has also found it along the branches of the vagus.

Pemphigus has not been observed on the tongue, but other parts of the mouth and pharynx are at times the seat of that trouble.

Leucoplakia has been spoken of as a psoriasis, because there have been a few cases found in which this whitish formation in the mouth was associated with psoriasis. These are, however, really two distinct conditions. Leokoplakia is a keratitic change of the epithelium. There are light forms and very severe ones. In the latter crevices or fissures may form, which bleed and are painful. These must be looked on as precancerous states. A leukoplakial area may exist for years, when suddenly it will develop rapidly into a cancer. Since the cause is not known, the treatment is also difficult. Some think it is syphilitic or that it develops upon a healed out syphilitic ulcer and consequently treat it by antiluetic measures. Seifert believes it is due to the use of the mercury in the treatment of the syphilis. Those who think it is due to the irritative action of tobacco, etc., have not enough evidence to support their theory. Surely antiluetic treatment is of little benefit. The best that can be done for this condition is to keep the mouth alkalin by washes, proper diet and attention to the gastrointestinal tract. The use of Mandel's solution, lactic acid or chromic acid, five per cent, has been advised. Then if there is any infiltration, a part of the tongue should be resected to prevent the development of a cancer. When there are fissures or ulcers as well as marked hypertrophies, it is better to remove this tissue thoroughly with either a Paquelin or galvanic cautery either under local or general anesthesia. It may be done in several sittings. Radium and X-rays are also being used.

SURFACE OF TONGUE.

A certain hornification can be normal, but when it is marked it is spoken of as hyperkeratosis linguæ.

A certain segment formation of the tongue may be normal, whereas when it is of a greater degree it is pathologic and is known as lingua desiccata or lingua plicata, according to Grünwald and Seifert; the scrotal tongue, according to Semon, and langue scrotale, according to Chambardel. This congenital deformity causes no real trouble; it is purely psychic on the individual that has one. It is said that catarrhal inflammation occurs more readily on such tongues, owing to the retention of material within these cavities.

Another similar condition, however pathologic, is the so-called map tongue, lingua geographica, etc. Usually found in children, Ruttin says it is seldom found in people older than six years. Czerny says it is a manifestation of the constitutional disease of exudative diathesis (scrofula). The characteristic picture is a plaque formation of a round or oval shape and different sizes, often slightly elevated and surrounded by a whitish border. The one peculiarity is that these spots come and go. It causes little trouble and is only of diagnostic value.

Papillitis linguæ, according to Duplaix and Seifert, is a condition in which one observes, usually at the tip of the tongue, raised red punctate spots corresponding to the papillæ, which are very painful when acid or sharp substances come in contact with them. The treatment comprehends the repeated use of the actual cautery and applications of local anesthesia.

Glossitis superficialis chronica, according to Moeller, presents a spotted formation on the tongue which also spreads from one place to another as in the lingua geographica, only here the spots are redder and irregular in shape. The papillæ are also swollen and thereby present small superficial ulcers which are painful, and consequently eating is distressing. This condition is mostly found in poorly nourished, anemic women. A bland diet should be prescribed, a local anesthetic usually before eating, and mild astringents. Preuss recommends a decoction of blackberries applied to the tongue as extremely gratifying.

Papillitis atrophicans lateralis, according to Wagner, results in ulceration of the tongue, surrounded by marked swelling. The ulcer appears to be due to atrophy. Excision of this painful ulcer ends the trouble.

Glossitis papulosa acuta, according to Michelson, is a condition in which a large number of elevations the size of a pin point form, and soon enlarge to the size of a penny. Fever and considerable pain are usually present. This condition disappears in a few days under mild antiseptic treatment.

Linguæ nigritis villosa, or black haired tongue, is a condition not infrequently found; usually in the center near the base a peculiar brownish black mass appears. The length of this socalled hair (hyperkeratosis) varies from 1 to 1.5 centimeters. A great deal has been written about the probable cause as well as the color of this growth. Some of the authors are Raymond, Dessois, Lannois, Roth, Davis, Schmiegelow, Sendziak, Weill, Guegneu, Schech, Hoenisch, Girandeau, Goodale, Nakamura, Blegvad, Chevalier and myself. The color is supposed to be due to foodstuffs stain. The reaction of the saliva being acid in most instances, it is thought that that is the great predisposing cause. Smoking is also given by many as a possible cause. Most of the cases have recurred in women.

Hornification of the dorsum of the tongue is described by Kronenberg in a man 70 years old who smoked a pipe incessantly. This man developed a cancer of the tongue.

SUBSTANCE OF THE TONGUE.

Glossitis Parenchymatosa et Abscedens.—A phlegmonous condition results from a trauma, from fissures and ulcers, associated with typhoid fever, from wasp and other insect stings. This condition at times appears very formidable, so that incision may become necessary. Such local infections may lead to a general infection or a true phlegmon of the whole oral cav ity (Ludwig's angina). When the tongue becomes the seat of abscesses, it may appear as an acute diffuse type, but more frequently is a circumscribed abscess of the dorsum of the tongue. This feels at first like a little marble and may last for weeks, with but little pain and feeling of tension. It soon begins to fluctuate and resembles a cyst. It should not be mistaken for a gumma or vice versa. Both gummas and cysts are usually painless. These abscesses heal usually very rapidly after an incision, and these should always be made parallel to the course of the tongue.

Chronic Granulomatous Diseases.—Tuberculosis is comparatively rare, considering how a tuberculosis of the epiglottis, etc., will ulcerate to the very bottom, and yet the tongue remain untouched. There are cases, especially in the much debilitated, in which this disease takes hold on the tongue, and in such cases it is of a miliary type. It is usually spread through blood and lymphatic circulation from a general tuberculosis. Primary tuberculosis of the tongue is reported by Senator and Weber, and they have found the bovine type of microorganisms. Glass saw a case of tuberculosis of the tongue follow the extraction of a tooth. It is nevertheless surprising how rarely the tongue—for that matter, the entire oral cavity—is infected with tuberculosis, when we consider that a tuberculous individual constantly expectorates sputum laden with tubercle bacilli. Aside from the miliary form there occurs the tuberculous infiltrate and ulceration of the tongue. These are likely to be mistaken for syphilis or a cancer, and the usual differential diagnosis by iodid or mercury treatment, with microscopic examination, will suffice. Some of these tuberculous ulcerations spread and become more numerous. They are usually surrounded with an area of induration and the surface has a tenacious secretion. In such instances there is much suffering, and the patient will rather not eat than endure the pain caused by taking food. There are forms of infiltrates of tuberculosis of the tongue that assume quite a size and have no particular tendency to ulcerate. These are spoken of as tuberculoma.

In the previously mentioned deep fissured tongue there are cases of tuberculosis, and only when spreading these folded areas apart can a sort of radiating of tracts between the muscular substance of the tongue be observed. The differential diagnosis of tubercular lues and cancer of the tongue is not always possible without calling to our aid all the various laboratory and therapeutic methods. Tuberculosis of the tongue when ulcerated is best treated by surgical methods, as excision and curettements or actual cautery give the best results. The employment of the Roentgen ray, radium, sunlight and other forms of ray therapy has not given as satisfactory results as surgery, and should only be used when the latter is not applicable, as for instance at the base of the tongue,

where only cautery, curettement and the various forms of ray treatment may do so much good.

Lupus.—In two thousand cases of all forms of lupus at the Finsen institution, Strandberg found fifteen cases of the tongue. It occurs in the form of multiple elevations which become confluent at times and seldom ulcerate. The course is like lupus anywhere else, such as periods of remission, with areas healing spontaneously while others are developing side by side. There is comparatively little trouble from these infiltrated areas, which may last for years, when suddenly the process breaks out into a general miliary tuberculosis. The treatment is surgical in the resection, curettage and the actual cautery. Recurrences are very common.

Syphilis of the tongue occurs in all ages, as (a) primary and chancre, (b) secondary or papule, and (c) tertiary or gumma.

As stated in the considerations of tuberculosis of the tongue, it is the differential diagnosis that is the all important part, since the treatment is rarely surgical and since the condition always responds to the antispecific medication.

Again, we must bear in mind that a tuberculosis and lues of the tongue may coexist, as can lues and carcinoma. When an ulcerated syphilitic tongue or, for that matter, any form of destructive process, heals out, there results a scar that may require surgical intervention. There is one form of secondary scar formation of the tongue following marked ulceration of the surface of the tongue, which is known as chronic interstitial glossitis, and is also known as the tongue sclerosis or shriveled tongue.

In such tongues we often find crevices with secondary infections and small nonsyphilitic ulcers.

Actinomycosis involves the tongue next to the lower jaw, the most frequently in the oral cavity. The type of lesion is a circumscribed hard node. Diagnosis is made by puncturing and finding the actinomyces. Cases of actinomycotic abscess of the tongue occur, according to Kümmel, not at all infrequently, and give the same distressing symptoms of dysphagia and difficulty in speaking as tongue phlegmon. He has also seen cases of actinomycosis simulating Ludwig's angina. The treatment of actinomycosis of the tongue is to make wide

and deep incision, since the process is invariably located in the depths of the tongue. Internal administration of large doses of iodid, X-ray and radium have been used with considerable success.

TUMORS OF THE TONGUE.

(a) Produzione sotto lingulate, of the Italians, is a tumor-like mass of the frenum linguæ in the nurslings. Bernheim-Karrer has examined these small growths microscopically and found them to correspond to a chronic granuloma. Treatment is excision.

(b) Fibroma of the tongue is not infrequent; a number of these have been found to be congenital. These exist for a long time without any symptoms. They are distinctly circumscribed and may occur on any part of the tongue. In some rare instances these grows have a pedicle. The fibroma pendulum are at times mixed with sarcoma. Histologically it is often very difficult to differentiate between sarcoma, fibroma, and gumma before softening. These fibromata are usually easily shelled out of the tongue, and if this is not easily accomplished operation should be deferred until a microscopic examination is made.

(c) Lipoma of the tongue is a round, soft, and oftentimes semifluctuating tumor. Abscesses and cysts may be mistaken for it. The treatment is strictly surgical and the lesions may easily be peeled out of the tongue substance. The growth is perfectly harmless and requires operation only when very large, causing difficulty in swallowing and breathing and speaking. At times it may get into the way of the teeth and the patient bites into the tumor mass.

(d) Myoma of the tongue usually occurs at the base, but Brooks and Stebbins found a rhabdomyoma on the dorsum of the tongue and Casezza a leiomyoma near the tip.

(e) Osteoma.

(f) Chondroma and other mixed tumors of the tongue have usually been diagnosed only after operation and microscopic examination.

(g) Chloroma of the tongue which, however, was found by Sternberg and was diagnosed as a lymphosarcoma before operation.

(h) Amyloid tumors of the tongue are usually found at the base.

(i) Papilloma of the tongue is usually associated with papilloma elsewhere in the oral and pharyngeal cavity. The peculiarity of papilloma of the tongue is that it is always solitary, in contradistinction to the multiple papillomata of the larynx or the skin. It is also noteworthy that it does not recur as frequently when once removed. If it does recur, according to Simpson, it is well to be on the lookout for sarcoma or carcinoma. The treatment is surgical; a snare or curette has proved the most satisfactory instrument.

(j) Angioma of the tongue as well as other vascular tumors has the characteristic color of venous distentions. It is usually multiple and congenital, and remains unchanged for years, when without any warning it may grow rapidly.

In children angiomata may sometimes be large; they are described by Hallopeau as nævus enorme; when they spread all over the one or both sides of the oral cavity they are known as cavernomata. Serious symptoms occur at times, especially in children, such as bleeding and choking.

(k) Telangiectatic granuloma or botryomykosis of the tongue, according to Koujetzny, is an easily bleeding tumor mass, looking much like a raspberry, situated at the base, having a long pedicle. When removed, it rapidly recurs unless a part of the healthy tongue is taken away at the same time.

(l) Lymphangioma of the tongue may occur as solitary or diffuse masses known as macroglossus lymphatici. The tumor mass is subject to inflammation and swelling, but it recedes again in due time.

(m) Lymphatic cysts of the tongue have been described by Kümmel, Rosenack and Feldmann. The macroglossia or lymph vessel tumor of the tongue is characterized by unilateral or bilateral swelling which has periods of exacerbation due to inflammation. The more repeated the attacks, the less likelihood there is of the tongue going back to its original size.

All the vascular tumors are best treated by cautery, either Paquelin, actual or electric; at times ligation of vessels is necessary preceding the cautery or excision. I have employed the surgical diathermia as well as radium in cases of angioma

and lymphangioma with considerable success. In the case of macroglossia excision of a part of the tongue may become necessary when the tumor assumes great proportions and threatens to choke a patient.

(n) Endothelioma of the tongue was observed by Kümmel, but he designated it as a cylindroma.

BASE OF TONGUE.

On account of the location of the lymphoid tissue in this area (the lingual tonsil), we have the greater surgical difficulties from diseases of that structure. However, there are conditions entirely independent of this lymphoid mass.

The degree of hypertrophy of the lingual tonsil varies, but when it is marked the epiglottis may be pushed up and back. Dilated veins are usually found between follicles. At times the hypertrophy on one side or the other may be near the anterior pillar. The various changes in the lingual tonsil are to be considered pathologic only when they produce symptoms, and only then is surgical intervention required. Many of the symptoms have been considered as nervous manifestations because they are indefinite; usually, however, there is a sensation as of a foreign body which these patients constantly attempt to remove by hacking, rasping, etc. They often complain of pain at the base of the tongue. Both these sensations disappear, usually after eating, for a time. Small hemorrhages may arise from the dilated veins, usually in the morning. Many true neurotic symptoms, on the other hand, occur as a result of hypertrophy of the lingual tonsil, especially if acute inflammatory attacks develop in it. Such symptoms as dysphagia, voice fatigue and even change in the voice are not uncommon. It is my opinion that not enough attention is given to this organ as a source of disease; it is surprising how easily patients are permanently relieved of these vague symptoms by proper attention to a hypertrophied lingual tonsil. A good test of the hypersensitiveness of the lingual tonsils when it causes these symptoms is the application of alypin, ten per cent solution, by which they will be much lessened or relieved.

The treatment required comprises local applications of silver and iodin, chemical or electric cautery and operation. Chromic

acid, trichloracetic acid, nitrate of silver in pure form are the best chemical substances to destroy the lymphoid follicles.

The operations are performed by guillotine, scissors, curettes, and biting forceps, of which there are many varieties, but of essential importance is the thorough removal with the least amount of traumatism. Actual cautery is especially applicable in the cases where the veins are much in evidence. Care must be exercised not to touch the epiglottis; it is well to push it out of the way.

Local infiltrating by means of a two per cent novocain solution or applications of powdered cocain for surface anesthesia, is sufficient in almost any case. Reaction is greatest after the chemical and actual cautery, and least following the operations by instruments, as curettes, etc. Light diet, ice pellets, voice rest and mild gargles of hydrogen peroxid and alcohol are very beneficial.

Varicose Veins.—These may be of slight or marked degree, but they require no attention unless they bleed. They are often associated with diseases of the heart, lung and kidney, and are present in many plethoric individuals. Actual cautery is the treatment above all others.

True Vascular Nevus and Ectatic Veins.—These occur at the base of the tongue, but cause little or no trouble.

Tonsilla linguæ lateralis is a condition of hypertrophy of lymphoid tissue just at the plica triangularis. It at times becomes the seat of acute inflammation and often becomes hypertrophied after the removal of the faucial tonsils. Levinstein has reported a very interesting case of this sort which produced marked symptoms which disappeared when this mass of lymphoid tissue was removed.

Associated with hyperkeratosis leptothrici of other parts of the Waldeyer's ring, the same whitish masses are invariably on the base of the tongue. The treatment is indifferent. Usually they disappear spontaneously. According to Katz, there is a form of angina leptothrica in which the base of the tongue is the most frequently involved. This is an inflammatory disease with yellowish white spots, as in follicular tonsillitis. As soon as the acute attack is over, the lingual tonsil should be thoroughly removed.

Tuberculosis of the base of the tongue is usually secondary to lung tuberculosis. The lingual tonsil is involved. Its diagnosis is impossible from its gross appearance. Seifert and Wroblewski have reported such cases, while Schaefert, Lipscher and others have described tuberculosis of the base of the tongue in the form of tumors, such as are seen in the larynx. Tuberculous ulcerations are usually associated with tuberculous ulcerations of the epiglottis. The diagnosis is not difficult. Laryngeal tuberculosis is also commonly present. Heymann had a patient, however, in which the larynx was not involved. The treatment comprehends the removal of the tubercular tumors if possible, but usually the cautery or possibly the curette are the only instruments that can be used.

Lupus of the base of the tongue is considered rare, only about six cases having been recorded in which there were no other areas involved. The treatment is surgical, but X-rays, Finsen and radium have been recommended.

Syphilis of the base of the tongue is seldom a surgical condition. Of one hundred and sixty-nine cases of primary chancre of the oral cavity, according to Kampf, not a single case occurred on the base of the tongue. Secondaries are quite common, either in plaques or swelling of the lingual tonsils. At times this gland becomes large, and if operation is performed by mistake for some other condition, serious complications and consequences may follow.

Gumma, which breaks down, occurs quite frequently, but like other luetic conditions it heals quite rapidly under proper antiluetic treatment.

Injuries of the base of the tongue rarely occur, and only when some sharp object like a piece of bone is swallowed. In one case the sting of a wasp, which happened to be in water which had been swallowed, caused a marked swelling of the base of the tongue which, however, lasted for a short time.

Foreign Bodies at the Base of the Tongue.—Fish bones and bristles are probably the most frequently found. Many cases are recorded in which needles, pins, particles of food, particularly the shells and hulls of certain fruits and vegetables, have been located in the lingual tonsil, where they caused a great deal of trouble until removed. Palpation aids in the laryngoscopic examination. Swallowing a foreign body gives

the patient the feeling as if it was still present. If a foreign body remains in the tissues of the base of the tongue an abscess may result, which is a much more serious condition, which must be treated accordingly. Most foreign bodies may be removed with a curved forceps by the aid of the mirror or by the direct endoscopic method.

TUMORS AT THE BASE OF THE TONGUE.

There are two forms, nonmalignant and malignant. Most of the types of nonmalignant neoplasms have been described. There are some, however, that should have particular mention.

Lingual thyroid may be present as an accessory gland or replacing it. The size varies from that of a hazelnut to that of a small egg. It is usually located in the center, but may sometimes be on the side of the tongue. It is usually smooth and somewhat hard, but if it becomes cystically degenerated it may even fluctuate. They have been known to become infected. I have had one case of each type, one terminating fatally after operation, and one successfully. The condition is virtually an embryologic misfit. Inconsequential symptoms are usually present, but if the gland is large it may change the voice, cause pain and produce difficulty in breathing. The treatment is removal, and this may be accomplished under suspension or externally by a superior pharyngotomy. Care must be exercised to note whether these patients have a thyroid gland in the usual place, before attempting the removal, otherwise myxedema may develop.

Thyroglossal duct tumors or cysts at the base of tongue are retention cysts of dermoid character, according to Bernays and Rosenberg. In one there was actually a tooth present in the sack. These cysts are usually easy to shell out and will not recur. Other types are cysts developing from the region of the foramen cecum, which have been designated as ranula of the base of the tongue. They are filled with a clear fluid. Brayden Kyle and others have described such cases. Hauszel described a case of cysts of the base of the tongue, that was multilocular but very large and firm.

A third form of cysts at the base of the tongue is the one developing from the mucous glands. These are very large at times, but, strange to say, they cause very little inconvenience

and usually are discovered accidentally during the routine examination of the throat. In the removal of these cysts it is well to take away a large part of the cyst wall to prevent recurrence. A fourth type of cysts at the base of the tongue are those of the fossulæ of the lymphoid follicle. They are small and contain a mucus-like secretion. These, however, cause discomfort, more especially giving the feeling of a foreign body present. These cysts are best removed in toto with a punch.

Amyloid tumor is a peculiar formation at the base of the tongue, but quite rare. It is usually multiple formation, hard, the size of a cherry or smaller, and has a waxy appearance. The tissue gives a true amyloid reaction. These cases have been found mostly postmortem, although Martuscelli had a case of fibroma of the base of the tongue that had undergone amyloid degeneration.

Lipomata at the base of the tongue are soft yellowish growths which are often unrecognized until the operation. They may be large and yet cause little trouble. Albert describes a case in which the entire isthmus was practically filled and yet the patient (a girl of sixteen years) said she only felt as though a hair was in her throat. These tumors are usually easily peeled out from within, but they may be so large that it would be safer to operate externally. Fletcher Ingals had one such case necessitating external procedure.

Vascular tumors at the base of the tongue are not frequently encountered, in spite of the fact that the blood supply is very abundant. Micheal described a true cavernous tumor which he was able to destroy by actual cautery, and Kronenberg saw a vascular nevus in the region, but the same growth spread to the cheek and the floor of the mouth. Ricciolli described a case of fibroangioma of the base of the tongue, which he removed with a hot snare.

Myomata of both striped and unstriped muscle fibers have been found at the base of the tongue by such men as Glas, Baumgarten, and Gasazza. True adenomata have also been described in this region of the base of the tongue.

Fibromata and fibrosarcomata of the base of the tongue are very difficult to differentiate clinically. Haker, Prota,

Kümmel, Marinscelli and others have shown that these may occur as sessile or pediculated.

In the sessile form the differential diagnosis between carcinoma and abscess or gumma is important and at times very difficult, especially as to gumma. The treatment is eminently successful by peeling out the growth if sessile or snaring off if in the pedunculated form.

Papillomata, which occur quite frequently at the base of the tongue, present no diagnostic difficulty. Removal is seldom followed by a recurrence, particularly when it is performed thoroughly by curettage or dissection. A very painful form of papilloma described by Kümmel and Albert arises from the papilla foliata. The pains which are neuralgic in character appear especially when the patient is eating. Chauveau describes this condition as papillary glossedynia.

MALIGNANT TUMORS.

Carcinoma is rarely found in this region unless it has developed from the epiglottis or the tonsils. Butlin, to my mind the greatest author on the tongue, has only seen one case out of eighty which he thought had its primary origin at the base of the tongue. Schmiegelow, Sendziak, Castex, Ziagi, Micheal and Eve have each described a case.

Sarcoma is very rare in the pure form. Up to 1891, only seventeen cases of sarcoma of the tongue were collected by Schelier, and only five of these were of the base. Johnson, in 1904, said he found twenty-five cases reported. These sarcomata occur in two forms. The lymphosarcoma, which resembles the same kind of growth of the tonsil, is pale, soft and very rapidly growing. Its orgin is the lymphoid tissue of the base of the tongue and conseqeuntly in the lingual tonsils. It is very interesting to note that the regional glands are involved, which is not the rule in sarcomata in other regions. Treatment with large doses of arsenic and iodid of potassium often stops the growth—in fact, it has been seen to disappear partially, and yet microscopic examination proved it to be sarcomatous. The other form of sarcoma at the base of the tongue corresponds to those we meet in the nasopharynx. It is a very hard tumor and the diagnosis can easily be made by the microscope. In the operable cases of malignant growths

in this region it is only when a part of one side is involved that it may be excised and a cure expected, but if the process has extended to neighboring structures or to the other side, radical surgery alone is possible (complete excision). In the inoperable cases of sarcoma, radium is recommended.

CASE REPORTS.

Case 1. Chronic Focal Infection.—Mr. X. complains of feeling miserable most of the time, having frequent colds and rheumatoid pains in and about several joints of the body.

Examination shows a fairly normal nose, several bad teeth, degenerated small tonsils and a markedly coated tongue. He was advised to have the necessary dental work done, as shown by a roentgenogram, and to have his tonsils removed. Following these procedures, the patient improved some, but not entirely. Having excluded other foci of chronic infection and obtaining no benefit from autogenous vaccines, as well as other forms of general tonic treatments, I began to investigate the tongue. Scraping the surface of the tongue and examining this material, I found an enormous bacterial flora. Cleansing the surface further by soap and water, followed by manipulation of the tongue, and again scraping it, I found a considerable reduction in the bacteria.

After a third manipulation of the tongue with cup suction, I still obtained bacteria in fairly large numbers. I now painted the surface with tincture of iodin, ten per cent (officinal preparation), and waited fifteen minutes, and then repeating the last procedure, namely, manipulation, I was unable to find very many bacteria. These were mostly staphylococci and nonpathogenic bacilli. In making cultures from the first scraping and plating them out subsequently, we found very few streptococci, and these were mostly of the pyogenic type. Following this form of cleansing, namely, washing with soap and water, followed by manipulation and suction and tincture of iodin, which was repeated three times during one week, the patient began to feel better. After that he repeated this cleansing once a week, which he has been keeping up since, now six months. It was noticed in his case, as well as in many others similarly treated, that the tongue would become quite sensitive following too vigorous and frequent applications of the tincture

of iodin. In some of the cases a dilute solution of the tincture of iodin was used, and then this sensitiveness was less observed. The taste for food was markedly improved.

By reason of these observations we have been led to believe that there is considerable absorption from a chronically infected tongue, and we have adopted the routine measure of cleansing the tongue in all cases of chronic focal infections, whether we removed the tonsils or any other focus of infection.

Case 2. Tongue Abscesses.—Mr. D., thirty-two years old, noticed a stiffness in his tongue for several days. This soon became painful, especially when moving it, as in swallowing. Speech became thick and mouthy.

Examination showed a swelling on the side near the middle of the base, which was somewhat tense and not very tender. Temperature, 99. Waiting a few days for observation, I found all the symptoms increased, the patient experiencing a great deal more pain, radiating to the side of head and neck. Swallowing became almost impossible on account of pain, and additional symptoms developed, such as difficulty in breathing when sleeping; temperature, 102. Deciding to open the abscess, I found at the point of fluctuation that I had to go quite deep to get the pus, which was small in amount. It was yellow, and culture showed pure staphylococci. Placing a small piece of gauze into the cavity, I was surprised that it was retained in spite of the movements of swallowing, etc. On the fourth day I injected some bismuth paste, and the patient made a complete recovery. The etiology has never been explained in this case.

Case 3. Angioneurotic Edema of Tongue.—Mr. L., sixty-three years old, noticed a periodical swelling of his tongue for more than a year. Aside from a slight interference in speaking and swallowing, it was of no inconvenience. Of late, the swelling has been getting larger, and the periods which at first were about one to two weeks apart, are now more frequent. During the past week he had two attacks. Furthermore, other portions of the body showed similar manifestations. The lip, one or the other eyelid, the prepuce, and anus were also affected.

At the time of the first examination there appeared to be but a slight enlargement of the tongue; otherwise everything was negative. I instructed the patient to let me know when he noticed the attack coming on, as it usually did with a sensation of burning and full feeling of the tongue. Being called, I found an enormous swelling of his tongue, so much so that it was too large for the mouth and protruded over a very much swollen lip. There was no pain or any other evidence of inflammation. Puncture caused very little bleeding, and the blood had no tendency to coagulate. Repeated tests of blood clotting showed a coagulation period of from fifteen to forty minutes (Sahli and other tests). Estimation of calcium content of the blood by the Simon method showed a marked deficiency of calcium. There was a marked pyorrhea alveolaris present, attention to which made some impression upon the process, but not until after a prolonged treatment by injections of horse serum did I notice any definite improvement. Calcium treatments had little or no effect. Nevertheless, he continued to have the attacks, and in addition developed cerebral attacks in the form of severe periodical headaches, such as are observed in brain tumors and laryngeal obstruction. The laryngeal mirror revealed the typical edematous process. Fearing a severe attack in the early morning hours, I arranged with a neighboring general practitioner either to intubate or tracheotomize him if necessary, and I had at his bedside a complete outfit ready for such procedure. Such an emergency did arise, but the physician was too late to perform the operation, as the patient succumbed before he arrived. Autopsy was fortunately permitted and completely carried out. Aside from a very large but otherwise normal heart, a considerable degree of chronic interstitial nephritis and an enlarged prostate, there was absolutely nothing pathologic demonstrated. The larynx was normal. A suggestion of edema of the brain and spinal cord, and some slight hemorrhages into the brain substance were also found. The noncoagulability of the blood during the postmortem and the delayed rigor mortis were noteworthy. About two pints of blood were saved and a complete physiochemical examination of it was made. (The detailed findings of this work is purposely omitted, because the writer is working with his labora-

tory associate on this subject in several cases of other conditions wherein the blood clotting period was delayed.) The microscopic examination of the brain and spinal cord was negative, and the small hemorrhages had no pathologic basis in the condition of the vessels.

Case 4. Congenital Fissured Tongue.—Miss R., twenty-three years old, noticed that since she had had her thyroid gland removed for hyperthyroidism her tongue appears to be larger and the cuts, as she expressed it, deeper. She has always had these cuts, and her sister and mother also had them. Examination shows the typical picture of a lingua scrotolis (Figure 1). Aside from the peculiar appearance, such a condition of the tongue has no pathologic significance.

Case 5. Leucoplakia of the Tongue.—Mr. M., salesman for many years for a wholesale cigar concern and always a very heavy smoker, noticed for a long time a heavy coating on his tongue, which feels rough and dry and dulls his sense of taste. It was always white until he was advised to use permanganate of potash solution as a mouth wash, since which time it has turned brown. Attempt by him to scrape it off was usually followed by an increase into the growth.

Examination showed a typical case of keratosis of the surface of his tongue, nearly white in character, in addition to which there was a milky white deposit on either side of his buccal surfaces. The teeth are in excellent condition. He is otherwise perfectly well and denies any specific disease. Wassermann test is negative. Salvarsan was given; Wassermann still negative; no influence on the condition. X-ray treatment was very beneficial, but in due time the process returned. He is now under treatment with radium applications (fifty milligrams pure radium applied for a period of two hours twice a week). Thus far there can be seen no change in the condition.

Case 6. Hypertrophy of the Lingual Tonsil.—Mrs. McT. has had for some time vague symptoms in her throat, such as a full feeling, desire to clear it, coughing and swallowing. It feels as though there was something foreign sticking there. She noticed at times streaks of blood in her expectoration. She is otherwise very nervous.

Examination shows a marked hypertrophy of the lymphoid mass to either side of the epiglottis. The veins were consid-

erably dilated. The treatment consisted in repeated cauterizations—that is, different areas were burned with the actual cautery at each sitting. The result was perfect in every way.

Case 7. Decubitus Ulcer of the Margin of the Tongue.—Mr. Cl., twenty-two years old. For more than a month he noticed that his tongue was sore and often would bleed slightly. Examination showed a small ulcer on the side of the tongue with somewhat indurated edges which correspond to the outline of a jagged edged tooth. The diagnosis and treatment consisted in removing the tooth, whereupon the ulcer healed promptly.

Case 8. Decubitus Ulcer.—Miss S., thirty-eight years old. The history was very much like that of case 7, with the exception that the ulcer has been present for about four months and she has noticed some glands in the neck corresponding to the side of the tongue affected. The tooth was drawn and the ulcer treated by applying Kimmel's mixture, with little or no effect. The ulcer was excised widely with considerable healthy tongue tissue and the defect repaired. The microscopic examination was negative as to carcinoma or any other disease such as tuberculosis or lues. I consider this the rational treatment of a precancerous state. The glands in the neck were not touched in consequence of the microscopic findings. If they had been carcinomatous it would have been necessary to dissect out the glands radically. They disappeared within two to three months after the operation on the tongue.

Case 9. Varicosities at the Base of the Tongue.—Mr. Br., sixty years of age, complains of hoarseness which comes and goes. Examination: Slight congestion about his ventricular bands as well as the vocal cords. At the base of the tongue is a large mass of dilated tortuous veins, largest near the pyriform fossa and gradually thinning out as the dorsum of the tongue is reached. Since they were not bleeding or causing any other particular discomfort, there was no treatment applied.

Case 10. Radium Burn of the Tongue.—Mr. Stn., thirty-nine years old, was referred on account of a small swelling on his right upper alveolar region. Microscopic examination proved it to be a sarcoma, and radium was advised. One hundred and fifty milligrams of pure radium was applied by the

radium expert (for that is the procedure I believe should be followed when using radium) for a period of eight hours. Then the following day the dose was repeated. On the third day he began to complain of a hot sensation on the side of his mouth corresponding to the location of the radium tube. On examination one could see a marked hyperemic area. Similar ones were also present on the inner surface of the cheek and the roof of the mouth. The hot sensation was supplanted by a pain which soon became unbearable, and the patient could not eat without a great deal of pain, so refused food, even drink. About the fifth day the red surface took on a filmy appearance and all the evidences of a superficial necrosis. Incidentally the original sarcomatous growth began to vanish. The use of local anesthetic was of little or no benefit, and it became absolutely necessary to feed the patient by stomach tube in order to sustain strength. Figure 2 shows the leathery appearance of the burn. The condition continued almost two months without abatement. The physician was compelled to inject novacain before each meal in order that the patient could eat or drink. About four months from the time of the application of the radium, there was noticed a recurrence of the growth, and so rapid was this that within two weeks the greater part of the right superior maxilla was affected, and the patient died suddenly as though of brain embolism. Shortly before death the laryngologist who referred the case to me stated that the tongue looked almost normal with no evidence of cicatrices.

Case 11. Lupus of the Tongue.—Mr. Jld., twenty-five years old. Pain on the left side of his tongue for about a month, when he bit it while cracking a nut. Examination shows a swelling on the side and surface of the tongue close to the base and reaching pretty well anteriorly. It is somewhat tender to the touch and hard, with the exception of one place, which appears to fluctuate. I made a diagnosis of an infection, with the possibility of abscess formation. The above mentioned softened spot opened, and a small amount of watery discharge escaped. Some secretion from this area was expressed and examined bacteriologically, but did not reveal any tubercle bacilli nor any other organism in pure culture, only the

usual tongue flora being present. After about two weeks of observation and no improvement following simple local treatment, I excised a piece for microscopic examination, and demonstrated tissue characteristic of tuberculosis except there did not appear to be any caseation. Observing that the primarily involved area appeared to be healing and newer areas starting up, I concluded that I had to deal here probably with a case of lupus. The patient was subjected to the treatment of deep X-rays, and after twenty-seven applications spread out over a period of four months, the tongue was healed and patient discharged.

The patient's tongue was photographed stereoscopically at various times during the treatment, so as to show the progress or influence of the treatment, and Figures 3 to 9 demonstrate this very satisfactorily. Two years after treatment the patient remains absolutely well, but as can be seen in the last photograph there are many scars present in the healed-out process.

Case 12. Thyroid Abscess at Base of the Tongue.—Mr. Klm., forty-seven years old. The patient was brought to the hospital as an emergency case by a laryngologist, who stated that he was called to see this man the day before on account of great difficulty in breathing and swallowing. It was stated to him that that difficulty had appeared only about three days previously, gradually getting worse. Examination by the laryngologist in the house was very unsatisfactory, so he gave him some kind of a gargle and asked him to come to the office the next morning. The patient did not sleep all night, and his dyspnea had increased so that he was very weak. On depressing the tongue, the physician could see a smooth swelling corresponding to the epiglottis, and he concluded that it was either edema or an abscess of the epiglottis. At all events, incision was absolutely indicated, and he made a number of punctures which were followed by copious bleeding. There appeared to be some relief following this treatment and patient started home, but never got there. The doctor was hurriedly called, and found the man practically exhausted. In this condition he was brought to me, being scarcely able to drag himself to the examining room. One look at the patient

showed that he was dying, struggling for air. Placing him on the table without any preparations, I made a stab tracheotomy, but he made no attempt to breathe and artificial respiration had no effect. He appeared to have succumbed to exhaustion. A coroner case was made out of it because the postmortem was refused, and I was fortunately permitted to be present at the examination. It was found that at the base of the tongue was a mass somewhat smooth in outline and semisolid in consistency, having several hemorrhagic areas, which corresponded to the punctures made by the doctor. The epiglottis was normal. This mass was incised and found to be made up of thyroid tissue. In the center was a definitely localized abscess with a thick wall. Microscopic examination demonstrated:

1. Thyroid tissue of cystic variety and acute thyroiditis.
2. Abscess wall, old.
3. Staphylococcus pyogenes aureus obtained from the abscess.

The other organs of the body showed very little trouble, the heart in diastole, lungs normal, but there were nontubercular abscesses in the kidneys.

Case 13. Thyroid Gland at Base of the Tongue.—Mrs. McD., thirty-four years old. Has noticed for several years a swelling at the back of her tongue, especially if she protruded it, and gags. She could also feel it with her finger. It never bothered her until she had some gynecologic operations performed (various cysts were removed), when this growth began to increase in size and caused difficulty in breathing and speaking. A laryngologist was consulted, and thinking it a cyst of the epiglottis, thrust a needle with syringe attached into the tumor, but only a slight amount of blood fluid was aspirated. The patient was referred to me by this laryngologist, and I found that the epiglottis was mashed flat against the tongue by a growth which appeared to be smooth and rubber-like in feeling. I made the diagnosis of an accessory thyroid gland and advised removal of the right portion by means of suspension. This, however, was impossible, because we could not get a purchase on the spatula, and besides the patient could not breathe on account of pressure on the glottis. It was also

discovered that it was impossible to perform the operation under local anesthesia, because the patient was too nervous, and would not consent unless a general anesthetic was administered. A rectal or scopolaminmorphin anesthetic would have been preferable, but neither was at hand, so I decided to remove the growth by the external route, by means of pharyngotomy. Fearing considerable hemorrhage which could not be controlled without interfering with the breathing, I decided to do a temporary tracheotomy, which proved to be a wise move, both for control of breathing and anesthesia. The growth (Figure 10) was peeled off without any difficulty, and the raw surface stitched after ligation of three or four larger vessels. The patient made an uneventful recovery. The tracheal canula was removed before the end of a week.

Case 14. Carcinoma of the Tip of the Tongue.—Mr. Ldw., forty-six years old, for more than six months has had a sore on the tip of his tongue, and in the past two or three weeks there is bleeding whenever he eats anything. Pain is also present and treatment seems to be without avail. Examination shows a healthy, strong man, who states that he has never been sick a day in his life, has a healthy family and good family history as to tuberculosis, lues and carcinoma. He has, however, smoked a pipe for many years, of a type whose tip is made of horn and is bent in such a manner as to come in contact with that part of the tongue that is involved. This shows a crater-like ulcer with hard edges, and this ulceration extends to the floor of the mouth and inner surface of the mandible. There are no evidences of submental gland involvement. The rest of the physical examination is negative. The blood examination as to Wassermann is negative, and smears from the ulcer show no indication of either tuberculosis or lues. A piece of tissue was excised and examined microscopically and found to be carcinoma. I advised the excision of the greater portion of the anterior part of the tongue and floor of the mouth, including the submaxillary and sublingual salivary glands, also the inner surface of the mandible as far as the bone. I decided to do the whole operation by the aid of the Percy cautery, under general intratracheal ether anesthesia. The vapor was usually not blown when the cautery was in the mouth. There was at no time the slightest evi-

dence of the action of the heat and ether. The result primarily was all that one could desire. The patient was able to take nourishment the next day, and the wound was healing very nicely. The alveolar region, however, did not granulate as it should, and three weeks after the operation I noticed that a portion of the jaw appeared to be necrotic and sequestrating. I made out that such was the case and very easily removed it. Figure 11 shows what I believe to be a sequestrum due to coagulation necrosis of the Percy cautery. It was very satisfactory because it assured against my likelihood of any carcinoma involvement of the lower jaw. Figure 12 shows the case three months after operation. I was happy and felt that the case was cured. Eight months after the operation the patient returned with a swelling on the side of his neck which he said came on quite recently. He did not associate this at all with his original trouble, therefore did not come at once. Besides it was not giving him any trouble. Figure 13 shows a marked recurrence in the glands of the neck, but in the mouth and pharynx there is no evidence of any recurrence. This shows how imperative it is always to remove the glands of the neck en bloc, even though they are normal, in cases of cancer of the tongue.

I operated on this mass of cancerous glands, removing the carotid artery and internal jugular vein, muscles, etc., but there was a recurrence and the patient succumbed.

Case 15. Carcinoma of the Side of the Tongue.—Mr. Mlr., fifty-three years old, for more than six months has had a sore, swollen tongue which is being treated with medicines by his family doctor. Examination shows a very strong man, who states that he has always enjoyed good health. Never smoked. Family and venereal history negative. Wassermann negative. A piece of tissue excised from the main mass (Figure 14) was proven carcinomatous by microscopic examination. Radical operation was advised. First I resected the glands en bloc, deep and superficial, under local anesthetic. The wound was left open for several days and deep X-ray treatments employed. Two weeks later I excised through external wound and pharyngotomy more than one-half of the tongue, turning the remaining tip back and stitching it towards the base. The external wound was closed. Patient recovered and was

able to swallow fairly well in ten days. Three months later he returned with carcinoma at the base of the tongue and pyriform fossa which was declared inoperable, the patient succumbing within a short time after that.

Case 16. Carcinoma of the Tongue, Tonsil and Floor of Mouth, Including Glands of the Neck.—Mr. Bzd., forty-three years old, has felt a soreness, in back of his mouth on the right side near the tongue, for about two months, particularly when swallowing.

Examination showed an ulcerated area on the right side of the tongue and the bottom of the outside pillar. A part of the gingival margins of the last molar was also involved. This tooth was very much decayed and had very sharp edges. There was a mass of glands below the angle of the lower jaw in the right side, which were fairly movable. Physical examination showed a well preserved man, with no evidence of any other pathologic condition. Wassermann was negative, and the microscopic examination of a piece of the tissue proved it to be a carcinoma.

Operation.—By means of local infiltration anesthesia of the neck region the mass of glands was removed. The external carotid artery and internal jugular vein were so adherent in the mass as to be impossible of dissection. I therefore resected both arteries and vein with the mass. This latter extended up towards the styloid process region and great difficulty was encountered in ligation of the vein. The wound was united and it healed by primary union. The subsequent microscopic examination of the glands removed proved them to be carcinomatous, but the vein and artery were free from cancer cells. This was particularly studied, because it is stated by authors on the subject that arterial walls are never directly affected by cancer, except by way of ulceration of adhesion.

Two weeks later, under combined method of anesthesia, namely, morphin, grain one-half, hypodermatically, local infiltration of novocain, as well as application of pure cocain over mucous membrane surfaces and nitrous oxid analgesia, I removed two-thirds of his tongue by means of the Percy (so-called) cold iron. I also thoroughly attached with this heated instrument the anterior pillar, including the tonsil, especially at the base and floor of the mouth. He complained considera-

bly of the toothache at first while the heated instrument was employed, and we could feel that his teeth were very warm. This tooth pain entirely disappeared as we progressed with the operation (anesthesia of tooth pulp by excessive heat). There was practically no bleeding and the secretions were sucked up as rapidly as they formed by a suction apparatus.

Patient sat up immediately after the operation and took down a glass of water without any difficulty; of course it had to be poured into his mouth. Patient made an uneventful recovery, and at the end of two weeks left the hospital with the condition as shown in Figure 15. There is no evidence of any recurrence of carcinoma, and the patient is gaining in weight. He has some difficulty in opening his mouth (partial ankylosis), which he developed following the first operation of high dissection. This, too, made the second operation more difficult. He can swallow fairly well and manipulates the remains of his tongue in a very grotesque manner. His speech is practically unintelligible. The test of his teeth by a dentist shows that they are alive and that the excessive heat did not permanently destroy the nerves of the teeth. This is in contradistinction to what followed in case 14. It is my intention to have an artificial tongue made for him, such as recommended in the handbook of Preysing, Katz and Blumenfeld, Vol. 1, 2, p. 112.

Case 17. Carcinoma at Base of the Tongue.—Maj. Ads., fifty-eight years old. A laryngologist has been observing this man on account of hoarseness and some difficulty in swallowing, but only for a short period of time. These symptoms have been noted by the patient only about a month. His general health, however, appeared to be failing for some time. He has been having chronic bronchitis for years. The doctor noted the larynx negative, but in the vellecular region there appeared to be a large ulcer that affected the lingual surface of the epiglottis. The patient being an elderly man, and the ulcer not responding to the simple treatment, the doctor decided upon more active diagnosis and treatment, and referred the case to me. I found a much emaciated man, but was told that he always had been thin, although he had lost some weight. Laryngoscopic examination showed a condition corresponding to the description of the physicians. There was no evidence

of any glandular involvement of the neck; the larynx itself as well as the esophagus was absolutely negative. Blood, sputum, etc., were negative. A piece of tissue was removed, examined microscopically and found to be made up of granulation tissue. Consequently a careful examination was made for tuberculosis, since he gave a history of chronic bronchitis, and since, as is stated in the paper upon Butlin's authority, cancer at the base of the tongue is extremely rare. The roentgenographic examination of the chest as well as a very thorough physical examination, was negative as to tuberculosis. In spite of a negative Wassermann, I gave him two salvarsan injections, but there was no improvement in the ulceration. I again suspended him and took more tissue deeper within the ulcer and near the edges, and found that it was a carcinoma. I therefore advised a radical operation, which was performed by means of a transhyoidal incision. A general, however, light, anesthetic was given, but that I believe was the mistake which spoiled what promised to be a cure of a case of cancer of the tongue. The entire tongue, including the hyoid bone and epiglottis, was removed and the wound sutured, although I did not expect it to remain closed. A side drain was inserted. into the esophagus and brought out through the nose (Figure 16) for subsequent feeding until the wound was healed. Figures 17 and 18 show the growth removed, wide enough to prevent any possibility of implantation carcinoma. The patient rallied surprisingly rapidly from the operation. On the third day he became somewhat weak and was unable to clear the secretion from his bronchial tubes. We now began to use suction, which should have been done right after the operation, but in spite of all our efforts the patient grew weaker and at the end of ten days he succumbed to general anesthesia.

Case 18. Angioma of the Tongue, Also Involving the Floor of the Mouth.—Baby Wts., one year and seven months old. Mother noticed that shortly after the baby was born its tongue appeared somewhat thicker than the other infants she had raised, and that it was always blue. Calling the family physician's attention to it, she was told that it was due to the baby having been born with the umbilical cord about its neck and that it would disappear. Consequently the mother paid very little attention to this condition until she noticed that the baby

had difficulty in nursing. It appeared not to have room enough in its mouth for the nipple. Another physician saw it and made the proper diagnosis. The case was then referred to me, and I found that not alone was the greater portion of its tongue involved, but also the floor of the mouth so that the submental and submaxillary region puffed out like an overfat baby. These latter masses were, however, very much softer than the tongue process. Figure 19 shows the condition. At this time alarming signs presented themselves, in that the baby was not getting enough air. Therefore radium or X-ray treatments could not be considered. Some surgical measure was necessary. I decided upon the plan first suggested by my brother, Dr. Carl Beck, to ligate the angiomatous tissue in small masses by subcutaneous chromicized catgut, thus shutting off gradually the blood supply and not causing any sloughing. The immediate result was the reduction in the size of the tongue, and the baby did well for about two weeks, when it developed an attack of diarrhea which appeared to pull it down. There was also present a low grade infection in one of the ligatures. Owing to the previous starvation and the attack of summer diarrhea it could not stand this surgical procedure and died. I might say that at the time of the ligations I excised a small piece of tissue for microscopic examination and found it to be a cavernous angioma, with very little connective tissue about the blood vessels. This type of angioma are usually of a more malignant type, although they have no relation to a real malignant growth.

Case 19. Angioma of the Tongue Proper.—Mr. Bhm., thirty-seven years old, as long as he can remember, has had a swelling of his tongue, which did not bother him except that at times he would bite it while chewing, and it would bleed considerably. The consistency of the mass was softer than the normal structure of the tongue, and it had a distinctly bluish color. Feeling that it was nonmalignant, I advised treatment. I injected boiling water into the mass, usually about a dram at a time, in different areas each sitting. The result was all anyone could desire: absolute cure.

Case 20. Syphilis of the Tongue.—Mr. McC., thirty-seven years old. About six months ago his tongue became sore in several places, but particularly near the middle. In spite of

medical attention, by means of washes and local applications, it steadily grew worse, so that it actually hurt him to eat and he preferred to abstain from food. He gave a negative history as to syphilis and tuberculosis, and otherwise the history was negative relative to the present complaint. He had lost about thirty pounds. He decided to consult another physician, or rather a surgeon, who made the diagnosis of probable malignant disease, and removed a piece of tissue for microscopic examination. He was told that this verified the diagnosis of carcinoma. Radical operation of removal of his tongue was advised. The prospects of such an operation made the patient and the family very apprehensive, and they decided to get further advice. At this stage I saw the patient and found a tongue very suspicious of malignant disease. This was particularly due to the recent excision of a piece for microscopic examination (Figure 20). There had not been any Wassermann reaction. He was immediately given a large dose of salvarsan, which was repeated three times. The immediate result from this treatment was astonishing, for within two weeks his tongue was practically well and he had gained several pounds in weight. He was feeling otherwise much better, especially his mental processes. It interested me very much to see the microscopic section upon which the diagnosis of malignancy was made, but that privilege was refused me. The patient was further put on a thorough mercury cure, ar at the last time I saw him, several months after he was discharged, his tongue was perfectly healed, although there are scars present. (Figure 21.)

Case 21. Chancre of the Tongue.—Mr. Pfl., twenty-nine years old, was bitten by a prostitute while kissing. The bite, which was only sore for a day or two, healed and patient forgot all about it until two weeks later he noticed at the site of the bite a hardness which soon became very large so as to take in almost the entire tongue. It was very painful to move the tongue. A physician who saw it at the time thought that it was an abscess and brought the case to me for operation. The history, period of the incubation, and the point of softening made me decide to wait a day or two to see developments. The Wassermann was negative. Hot mouth washes relieved the pain considerably. The softened area broke down and we

were able to obtain the spirocheta pallida. Having read a report by Taylor of the good result of excising a primary sore of the tongue, in that he said the length of the general treatment was much shortened, I gave advice accordingly and was permitted to operate. There appeared to be a general infiltration of the tongue. There was, however, a definite area confined to about the place of the original bite. I excised the chancre, therefore, under infiltration anesthesia, and treated it as an open wound. It healed promptly, perhaps because he was given a large dose of salvarsan and inunctions of mercury. After six weeks of treatment I desisted from doing anything further except to make monthly Wassermann tests, and this for five months have been absolutely negative. At the seat of the excision is a bad looking scar. I attempted to stain the spirochete in the tissue, but this, however, proved impossible. All we had was highly inflammatory tissue within the tongue structure.

Case 22. Mucous Patches and Gumma of Tongue. Secondary Infection.—Mr. Tm., forty-nine years old, contracted syphilis about a year ago, and the process of passing from the primary lesion to the gummatous stage was the most rapid and widespread of any case that I have ever seen. Some of the best consultants in the case pronounced it the most malignant case of syphilis they had ever encountered. Treatment (before salvarsan was known) was absolutely of no avail. I wish to mention some of the lesions the patient had before he succumbed to a septic meningitis:

1. Primary sore on the glans penis.

2. Bilateral suppurative buboes.

3. A rash (early secondary), almost like a scarlatina.

4. Marked general adenopathy.

5. Marked plaque formation on the tongue, cheeks and palate.

6. Severe rhinopharyngolaryngitis.

7. Every finger and toe nail was affected.

8. Ulcerations of the nose with rapid sequestration, finally making a large opening in the hard palate.

9. Osteoperiostitis of the frontal bone with mass sequestration.

10. Sinking in of the bridge of the nose.

11. Ulcerative processes of the rectum and colon with hemorrhages.

12. Bilateral suppuration of his middle ears.

13. Three slight attacks of iridoscleritis.

14. Tibial necrosis.

15. Meningitis following an attack of erysipelas, apparently arising at the fistula in the frontal bone, and about the time that he had the slight attacks of iridoscleritis, markedly swollen base and side of the tongue, which broke down and became secondarily infected. Aside from the usual cleansing, there was not much to be done for this tongue affection, since any antisyphilitic treatment, whether by mouth, inunction or injection of mercury and iodids, made no impression upon this or any other of his lesions. The endurance of this man was most remarkable, because his digestion and rest were so much disturbed. It was necessary to resort to morphin to control some of the neuralgias from which he suffered.

I wish to name some of those who have seen this man, in order to show that nothing was left undone to stem this galloping type of syphilis: Dr. J. Nevens Hyde, Dr. Carl Beck, Dr. V. Vaughan, Dr. Jelks, Dr. Wolf Freudenthal, Dr. Lustgarten and Dr. Lieben.

Another interesting fact is that he infected his wife, who had also a very rapid destructive process of her nose, but treatment by mercury and potassium iodid appeared to stop the progress of the disease. The case was under my care at the time that the Wassermann test and the spirocheta pallida were unknown, but I have since made a test on the surviving wife and four children, and found that the mother still has a positive Wassermann, and the children, which, of course, could have become infected by accident, were negative. The mother refuses to be treated, notwithstanding the existence of a marked crusting ozena and the + + + Wassermann.

In this connection I wish to mention another case, although not as rapidly destructive, yet much like it and absolutely not influenced by the usual antispecific treatment. His patches on the tongue were constantly recurring and very painful,

requiring the use of cocain in order for him to be able to take food. He was about to have a breaking down of a septal and palatal gumma when the trial salvarsan came to Chicago, his Wassermann test having shown a + + + positive. Immediately after the first injection, which by the way was followed by a terrific reaction of vomiting, etc., the local conditions in his nose, mouth, etc., were very much improved, and after about eight more injections, within six months he was absolutely cured. His Wassermann became negative after sufficient length of time elapsed after treatment and has remained so now several years without any treatment.

Case 23. The Tongue in Acute Lymphatic Leukemia.—Mr. Bsb., twenty-eight years old, has never been ill that he can remember. About three months ago he began to feel a pressure in his head and at times a headache and a slight dizziness and a tired feeling. His appetite began to fail, and he was losing in weight. He also noticed nose bleeding, which was not easily stopped. About two weeks ago he noted a thickness of his tongue which interfered with his speech. It itched considerably, and this was relieved by pieces of ice held in the mouth. He consulted a doctor, who took an electrically heated needle and pierced the tip of his tongue. This did not give him any relief—in fact, he felt worse. At this time I saw him and found an anemic individual whose tongue was larger than normal, somewhat hard to the touch, but not tender. His voice was thick. Depressing his tongue with some difficulty, I found the pale mucous membrane of his pharynx and two enormously enlarged tonsils, smooth and not inflamed.

A complete physical examination was made, and with the exception of some enlarged lymph nodes in the neck, axilla, epitrochlear, inguinal and palateal region, there could be found nothing pathologic. On the following day the tongue began to show a triangular demarcation with the apex at the tip. This rapidly broke down in the form of a slough, and correspondingly he developed a temperature and small hemorrhages from his gums. Daily blood examinations were made and were as follows:

July 5, 1916. Blood examination: Blood count.—Red cells, 3,200,000; hemoglobin, 65 per cent (Sahli); white cells,

93,600. Blood smear—Normal cells; small lymphocytes, 81; large lymphocytes, 17; polymorphonuclears, 1. Blood smear —Pathologic cells; pathologic lymphocytes, 1 per cent.

July 6, 1916. Blood count—Red cells, 2,800,000; hemoglobin (Sahli), 45 per cent; white cells, 90,000. Blood smear—Normal cells; small lymphocytes, 91; large lymphocytes, 8; transitional, 1.

July 7, 1916. Blood count—Red cells, 1,600,000; hemoglobin (Talquist), 40 per cent, (Sahli), 40-45 per cent; white cells, 60,000. Blood smear—Normal cells; small lymphocytes, 57; large lymphocytes, 41. Pathologic cells—Myelocytes, 1; pathologic lymphocytes, 1.

July 7, 1916. Taken after transfusion at 2 p. m. Blood count—Red cells, 2,080,000; hemoglobin (Sahli), 45 per cent; coagulation time, 15 minutes, 5 minutes; white cells, 40-400. Blood smear—Normal cells; small lymphocytes, 84; large lymphocytes, 15; transitional, 1.

July 8, 1916. Blood count—Red cells, 2,800,000; hemoglobin (Talquist), 45 per cent; white cells, 100,000. Blood smear—Normal cells; small lymphocytes, 22; large lymphocytes, 70; large mononuclears, 5; polymorphonuclears, 1. Pathologic cells—Myelocytes, 2.

July 9th. Blood count—Red cells, 2,000,000; hemoglobin (Talquist), (Sahli), 45 per cent; white cells, 69,400. Blood smear—Normal cells; small lymphocytes, 20; large lymphocytes, 73; large mononuclears, 4; polymorphonuclears, 1. Pathologic cells—Myelocytes, 2.

July 11th. Blood count—Red cells, 1,760,000; white cells, 42,600. Blood smear—Normal cells; small lymphocytes, —; large lymphocytes, 92; transitional, 2; polymorphonuclears, 2. Pathologic cells—Myelocytes, 3; normoblasts, 1.

July 15, 1916. Blood count—Red cells, 1,280,000; hemoglobin (Talquist), (Sahli), 40 per cent; white cells, 50,200. Blood smear—Normal cells; small lymphocytes, 9; large lymphocytes, 20; large mononuclears, 65; polymorphonuclears, 1. Pathologic cells—Myelocytes, 5.

July 18th. Blood count—Red cells, 1,400,000; hemoglobin (Talquist), 35-40 per cent; white cells, 81,800. Blood smear —Normal cells; small lymphocytes, 88; large lymphocytes, 7;

large mononuclears, 2. Pathologic cells—Myelocytes, 2; pathologic lymphocytes, 1.

July 20th. Blood count—Red cells, 1,040,000; hemoglobin (Talquist), 35 to 40 per cent; white cells, 75,000. Blood smear—Normal cells; small lymphocytes, 71; large lymphocytes, 23; transitional, 2; polymorphonuclears, 3. Pathologic cells—Normoblasts, 1.

July 23rd. Blood count—Red cells, 80,000; hemoglobin (Talquist), 30 per cent; white cells, 103,000. Blood smear—Normal cells; small lymphocytes, 34; large lymphocytes, 35; large mononuclears, 21; transitional, 2. Pathologic cells—Myelocytes, 4; microcytes, 4.

The Figures 22 to 26 show the progress of the tongue destruction. Within ten days from his first visit he died, in spite of every effort, such as X-ray treatment, transfusion of blood and other medications. The tongue affection in connection with acute lymphatic leukemia is not recorded, and the fact that he had a feeling of stiffness of the tongue for a long period made it possible to draw the analogy between it and priapism.

Case 24. Lingua Nigra (Black Hairy Tongue.)—Mr. Chn., thirty years old, has noticed a heavy coating on the tongue, mainly in the middle and far back, but some of the material reaching almost to the tip. It has never troubled him until recently, except that he kept observing it and fearing it might lead to something worse. Recently he has noticed an irritation of the back of his throat that makes him cough, especially at night. He also complains of a very foul breath. Examination shows a thin, nervous man with a dirty brownish looking mass in the center of his tongue near the base, tapering towards the tip. The remainder of the tongue is also heavily coated but not discolored, nor has it the hairy appearance when a spatula is used to remove the coating. A particle removed and examined microscopically shows masses of hornified pigmental epithelium, which does not take on any skin. He has markedly diseased tonsils and caseous masses, many cavities in his teeth. With a flat electric cautery point I removed the entire mass, searing the base well. In due time I removed his tonsils and had his teeth put in shape. I have

seen this man regularly every few months for years, and there has never been any recurrence.

Case 25. Fish Bone in Tongue.—Mr. R., while eating some fish, noticed a bone lodged in his throat, and try as he might he could not dislodge it. Being a heavy smoker and having a highly irritable throat, he was very much disturbed with the irritation in that it made him gag, cough and have a constant desire to swallow. He went to two laryngologists, who were unable to locate the bone, either by inspection or palpation, and concluded that he had been probably scratched by a bone. He felt better when they applied some cocain, so one of the physicians gave him an atomizer with a five per cent solution of cocain, and some bromids internally. He could not sleep and became very much excited, so the family physician was called, and when he could find nothing by looking directly or feeling with his finger he brought the patient to me. I could find no evidence of any fish bone, but patient had a very red pharynx. I had read just a few days previously that fish bone will take on the stain of India ink deeper than other tissue, which fact might be used for diagnostic measures in such cases. Consequently I made up a solution of Chinese ink about twenty-five parts of water to one part of the commercial ink and let the patient swallow it slowly. By means of the laryngeal mirror I could distinctly make out the central circumvallate gland much darker than the rest of the tongue. Palpating this region I could not feel any fish bone. After observing it again and again, allowing him to rinse his mouth and finding that that spot remained black, I made up my mind that the finger pushed the bone into the gland when palpating. Consequently I took a pair of curved artery forceps, opened them and employed them in the form of a tongue depressor. The particular circumvallate gland that was supposed to contain the fish bone was engaged between the two blades of the forceps. While making firm pressure, the fish bone could be seen sticking out. I now grasped it and pulled it out. It measured a little over one and one-half inches, the protruding end being very sharp.

Case 26. Unilateral Paralysis of the Tongue.—Mrs. Alx., twenty-four years old, for over a year has been having pains in her head, radiating into her neck, especially on her left side.

The eye on the same side appeared to be larger and protruding. At times she had diplopia. She had some difficulty in getting her food down the esophagus and her speech was somewhat changed. She also noticed that one-half side of her tongue did not work. There were times that she would be dizzy and feel nauseated, but she never vomited. Examination showed a moderate exophthalmos, spontaneous nystagmus to the left. The vessels (veins) of both fundi were dilated, but there was no distinct choked disc.

The ears were negative in every way. No vestibular, cerebellar or cerebral disturbances demonstrable. The nose was negative. The soft palate was paralyzed on the left side.

The tongue was paralyzed on the same side, and there were evidences of partial atrophy (Figure *27*). The pharynx was otherwise negative. There was less of motion and sensation on the left side of the larynx. The left shoulder could not be raised as well, and it looked thinner than the opposite side. Otherwise there was nothing abnormal as to the physical and laboratory examination. This included spinal puncture and thorough examination of the fluid, and blood and X-ray. The sight was rapidly failing and the head pains were increasing, so I determined to do a decompression as well as explore the posterior or cerebellar fossa in the region of the foramen lacerum posterior, because I suspected a tumor in this area. I determined to reach this area by way of the posterior cerebral fossa—that is, lift up the occipital lobe and open the tentorium cerebelli. All went according to the plan until I lifted or rather displaced the brain, which was very much facilitated by a ventricular puncture. The tentorium appeared darker in color and very tense. As soon as I opened it, making an incision a distance away from any of the sinuses, there occurred a very profuse bleeding, venous in character. I put in a large gauze sponge which controlled the bleeding absolutely. By holding the sponge over the bleeding area, I was able to determine that the lateral sinus was not injured. Removing the gauze very slowly, the blood welled up the same as when the incision was made, so I again repacked and left the sponge in place. I placed, however, a piece of rubber tissue between the gauze and the brain tissue to prevent adhesions. The end of the gauze was allowed to protrude through the wound,

which had to be larger than for ordinary drainage. I expected some trouble in this case, but to my surprise there was not any. The gauze and rubber tissue was removed on the fourth day and the wound allowed to close. The patient recovered from the operation as well as from the pressure symptoms of the eyes and pains in the head. The organs supplied by the cranial nerves that were involved, however, never improved, but the condition did not progress. The tongue remains the same now, several years since the operation. I have never ventured to speculate upon the exact diagnosis, but I feel that it may have been a vascular tumor or aneurism.

Case 27. Unilateral Paralysis of the Tongue.—Miss Wrgt., nineteen years old, was operated by a competent otologist for radical mastoid, and facial paralysis unfortunately resulted. After waiting long enough for spontaneous recovery or improvement which did not occur, the patient was referred to me for a nerve plastic operation. It was decided to do a facial hypoglossal end-to-end operation. There is nothing unusual to record as to further findings or the operation. The following day I was astonished to find that her tongue was not even paretic on the operated side, and it took nearly a week before complete paralysis of the side of the tongue was established. Figure 28 shows the position of the tongue on the fourth day after the operation, still straight. By the way, it is now nearly two years since the operation, and the doctor reports that the patient has a good motion of the face of the anastomosed side.

Case 28. Bilateral Paralysis of the Tongue.—Mr. Dgt., forty years old, has been very much depressed on account of inability to obtain work, etc., and decided to commit suicide. By means of a razor he made a high bilateral pharyngotomy, catching both hypoglossal nerves. His attempt was not successful, as he was within a short distance of the Cook County Hospital, where the resident tied some of the vessels and closed the wound. Patient recovered quickly, with the result, however, of not being able to protrude his tongue. Examination showed everything normal within the oropharynx and larynx. There was a tendency for the tongue to drop back, especially during sleep on his back, causing some disturbance in breathing and producing a great deal of noise. His speech was also defective, as one can demonstrate if he

attempt to speak without the motion of the tongue. The patient was not willing to cooperate in order to get well, consequently I had a great deal of trouble to get his consent for an operation. I decided that the sooner a readaptation and suturing of the severed ends of the hypoglossal nerves could be done the better would be the result. I finally got his consent and found the procedure not at all difficult. Aside from the surgical experience this criminal condition will not be of any scientific or humanitarian value, because the patient made another attempt soon after he recovered from the operation, which was successful, this time hanging himself on the gas fixture. Figure 29 shows the tongue six weeks after the operation, undoubted evidence of atrophy.

CASES—TRAUMA OF THE TONGUE.

Some of the following individual conditions have presented themselves to me, and I will simply record them, since every case of trauma is a type of its own and its treated according to the best judgment of the physician.

1. Tongue bite during epileptic paroxysms.

2. Boy had the habit of protruding his tongue in making grimaces. Another boy wished to stop him from doing it, so delivered a blow from left ear upwards, making the upper and lower teeth meet. This caused practically the whole anterior portion of the tongue to be cut off. Immediate suturing saved it.

3. Boy while running fell, striking his lower jaw against a step. The tongue protruding at the time, was bitten through on one side. Immediate suture, primary healing.

4. Young man eating spaghetti in a hurry, strikes his tongue with a point of the fork. Marked reaction and infection followed, requiring incision; rapid recovery.

5. A dentist while cleaning the teeth of a lady, using a small sandpaper wheel on an electric engine, cuts the side of her tongue. The bleeding becomes uncontrollable by simple methods. I placed a stitch through this very slit, but employed silkworm gut drain. Uneventful recovery.

6. Scorching of the tongue and the rest of the buccal cavity by hot water to relieve a toothache. Keeping sweet butter in the mouth gave prompt relief from the effect of the burn.

7. Light degree of superficial destruction from the use of chemicals for gargles, especially the mixture so commonly used, water, acholol and listerin. Healing followed when the remedy was discontinued.

8. After three repeated uses of the suspension apparatus within the same number of days, there resulted a superficial lesion of the tongue, especially on the side near the floor of the mouth. It healed without any trouble.

The borderline cases of thyroglossal ducts and ranula, as well as lesions of the mouth, buccal cavity and throat in which the tongue becomes affected, I will purposely omit reporting, since they are not within the domain of tongue diseases. I wish to further state I have carefully avoided duplication in reporting my cases and have only transgressed this rule when the instance was of particular value, as in carcinoma.

Fig. 1.—Lingua scrotalis.

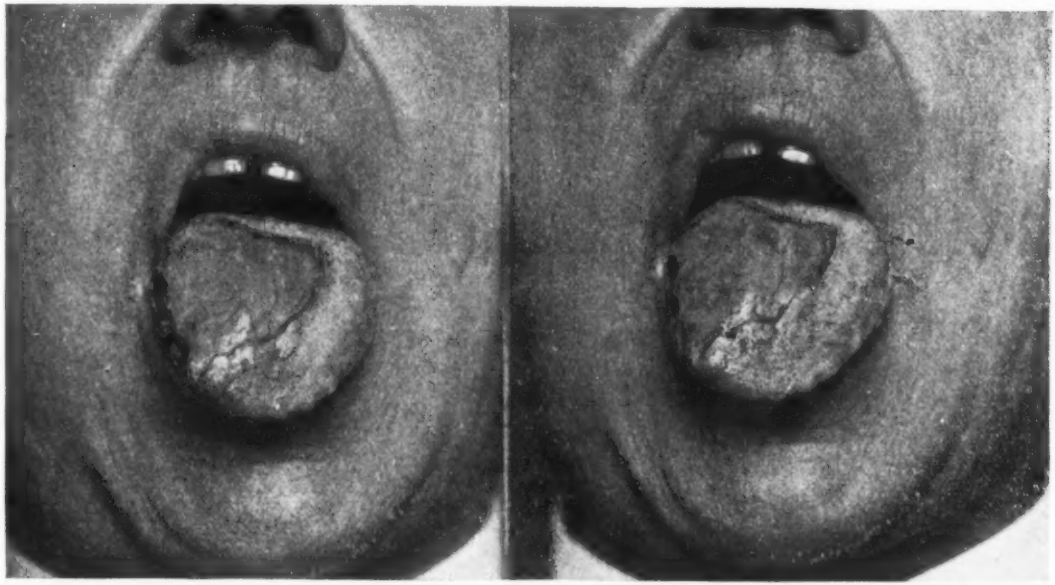


Fig. 2.—Radium burn of the tongue.

Fig. 3.—Lupus of the tongue.

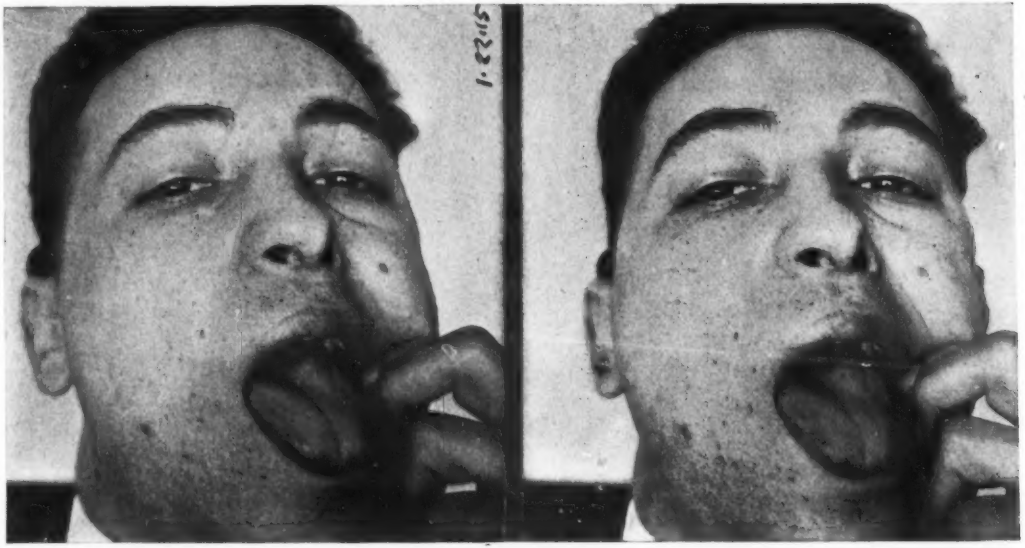


Fig. 4.—Lupus of the tongue.

Fig. 5.—Lupus of the tongue.

Fig. 6.—Lupus of the tongue.

Fig. 7.—Lupus of the tongue.

Fig. 8.—Lupus of the tongue.

Fig. 9.—Lupus of the tongue.

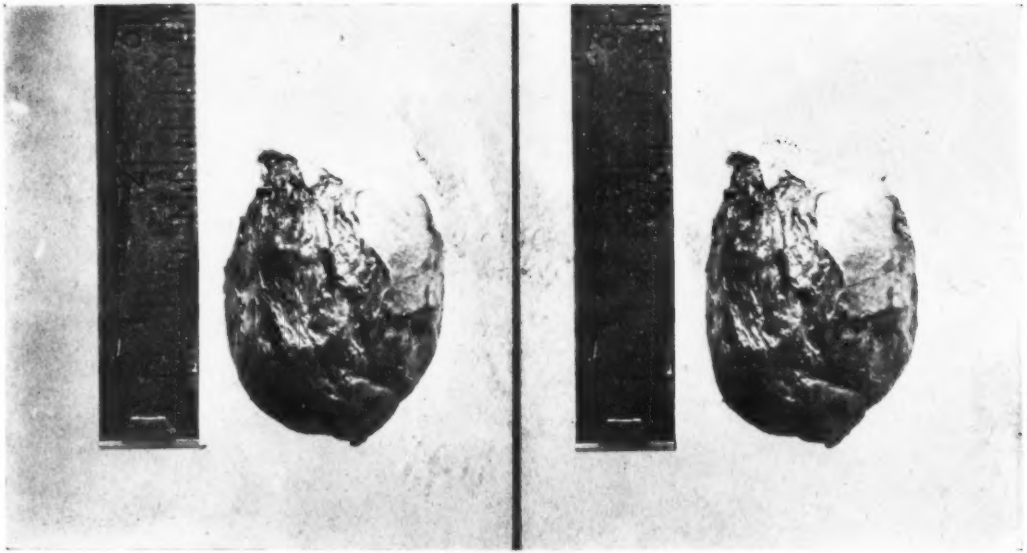


Fig. 10.—Thyroid gland at base of the tongue.

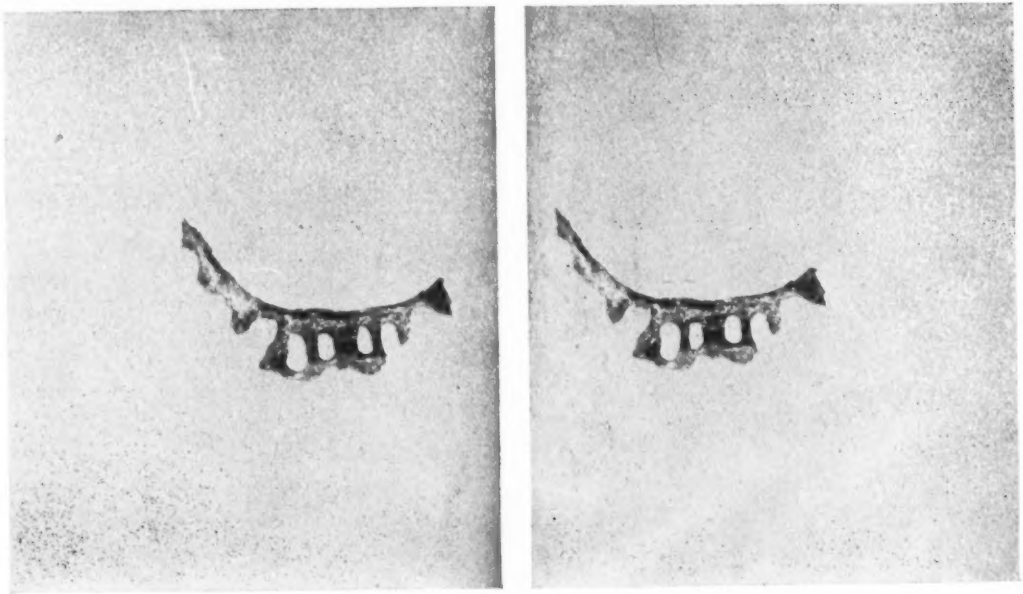


Fig. 11.—Carcinoma of the tip of the tongue. Sequestrum of the alveolar process.

Fig. 12.—Carcinoma of the tip of the tongue. No recurrence three months after operation.

Fig. 13.—Carcinoma of the tip of the tongue; secondary gland involvement.

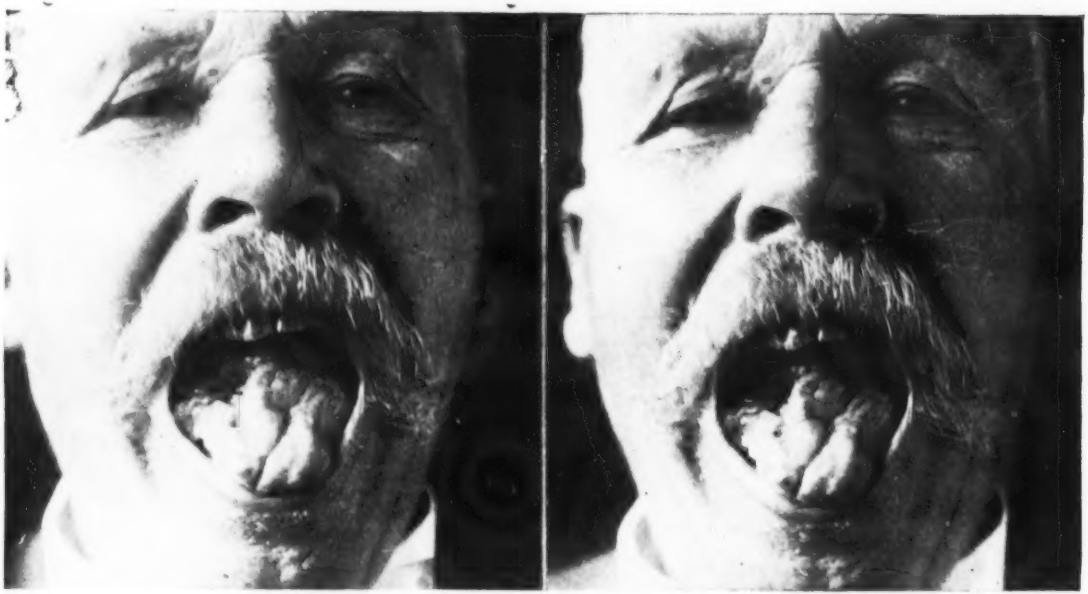


Fig. 14.—Carcinoma of the side of the tongue.

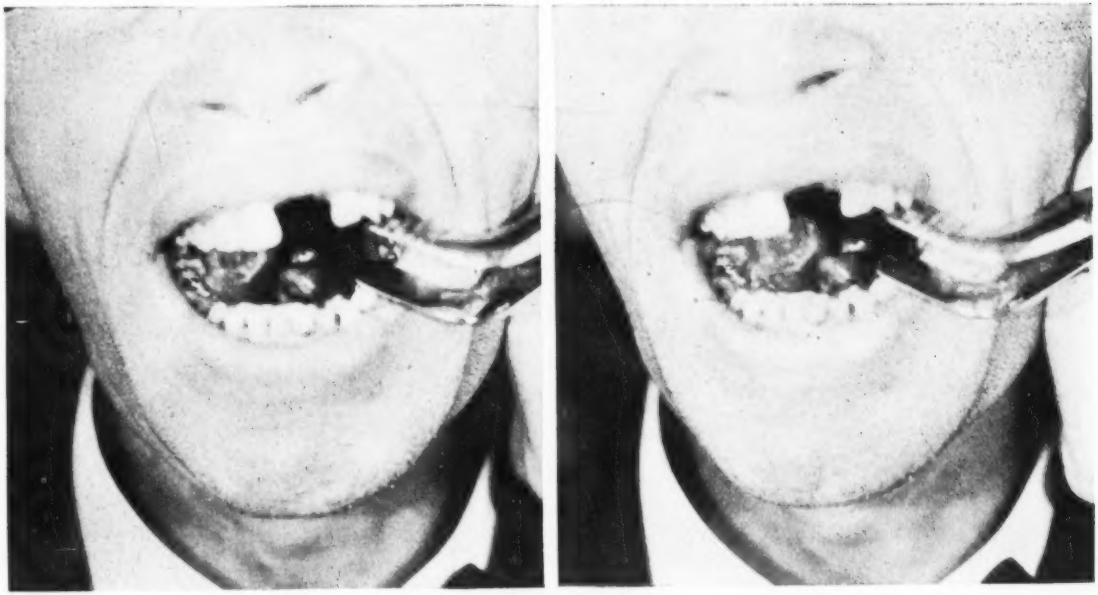


Fig. 15.—Carcinoma of the tongue, tonsil and floor of the mouth, including glands of the neck. (After operation.)

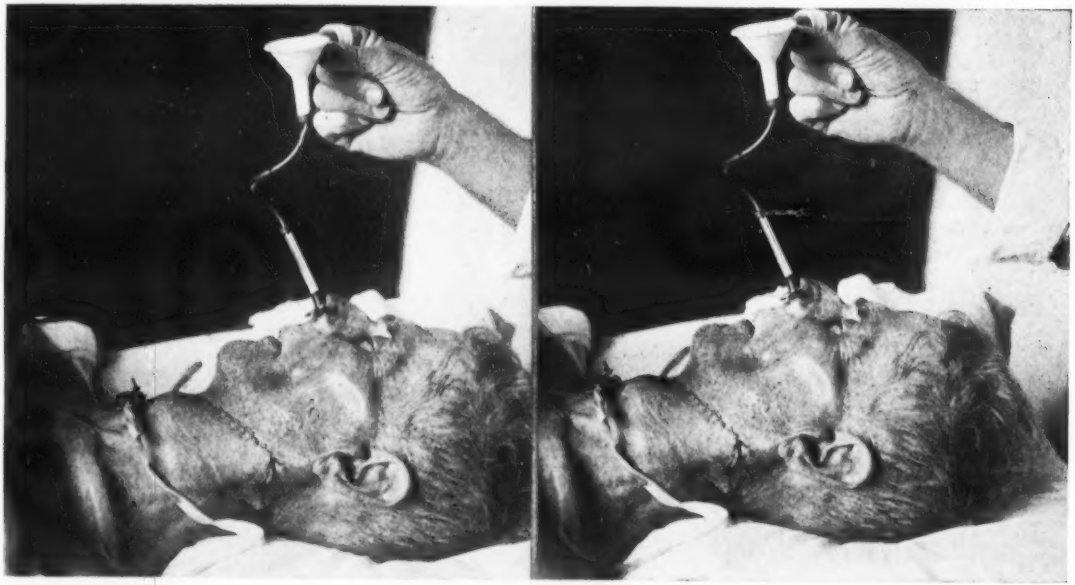


Fig. 16.—Carcinoma at the base of the tongue; postoperative; feeding the patient.

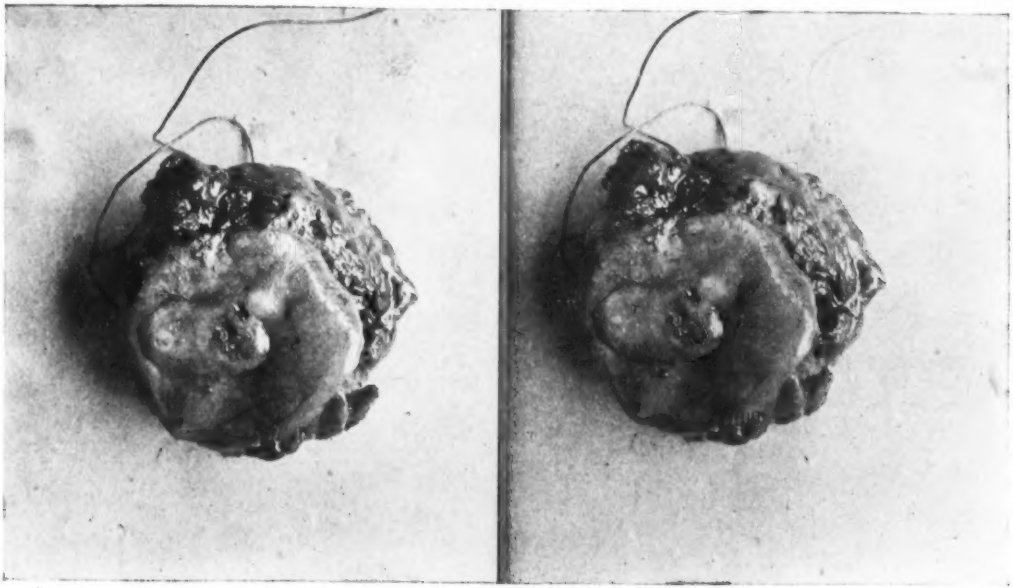


Fig 17.—Neoplasm removed. Face of the epiglottis.

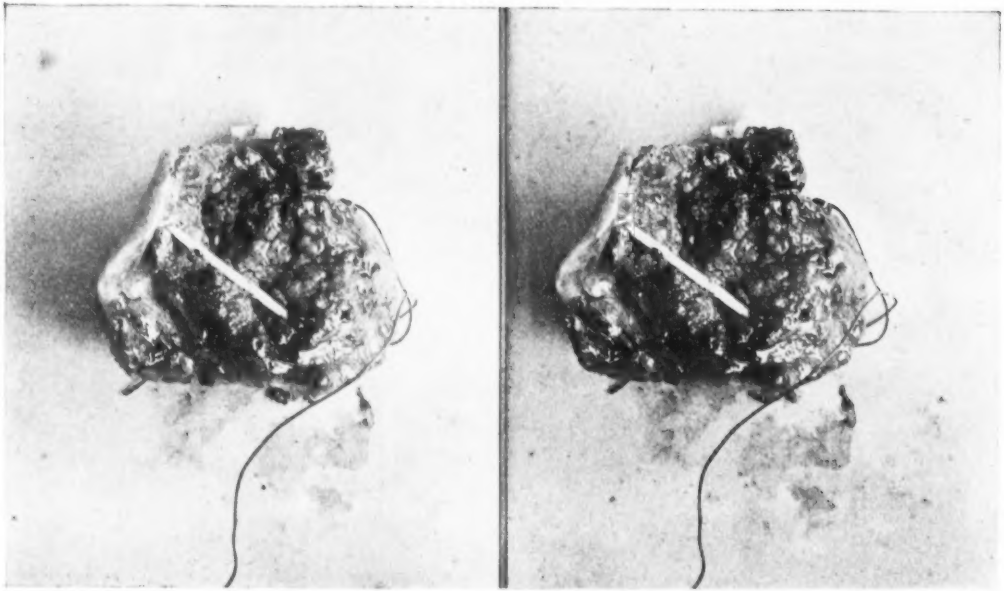


Fig. 18.—Ulceration of neoplasm. Vallecular region.

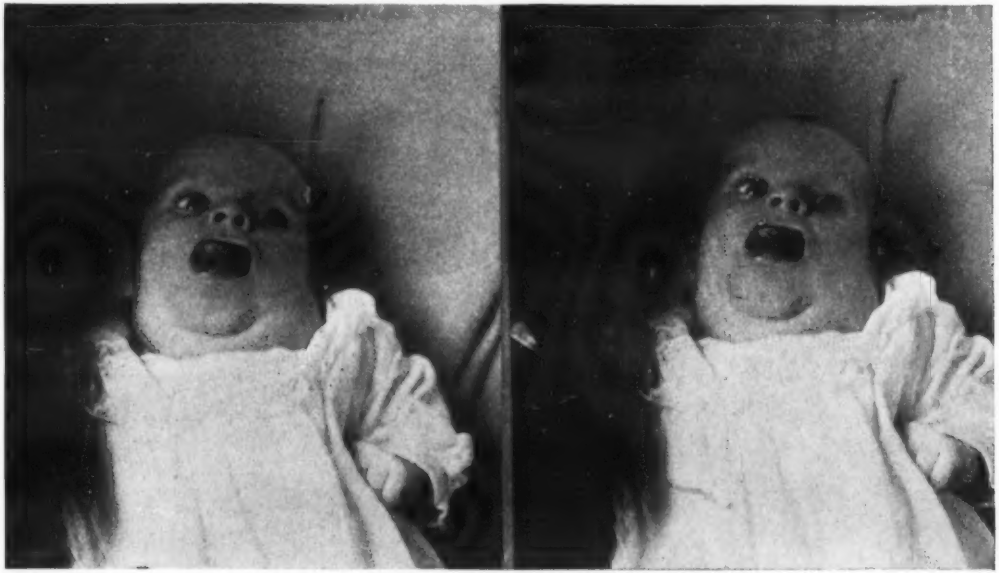


Fig. 19.—Angioma of the tongue, involving the floor of the mouth.

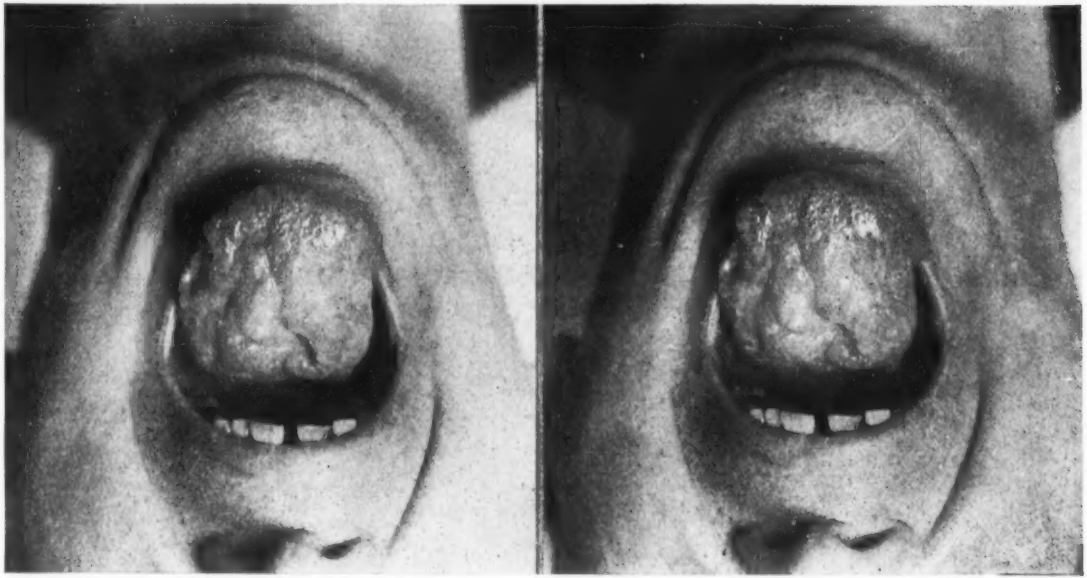


Fig. 20.—Syphilis of the tongue. (Mistaken for cancer.)

Fig. 21.—Syphilis of the tongue, healed.

Fig. 22.—Tongue in acute lymphatic leukemia.

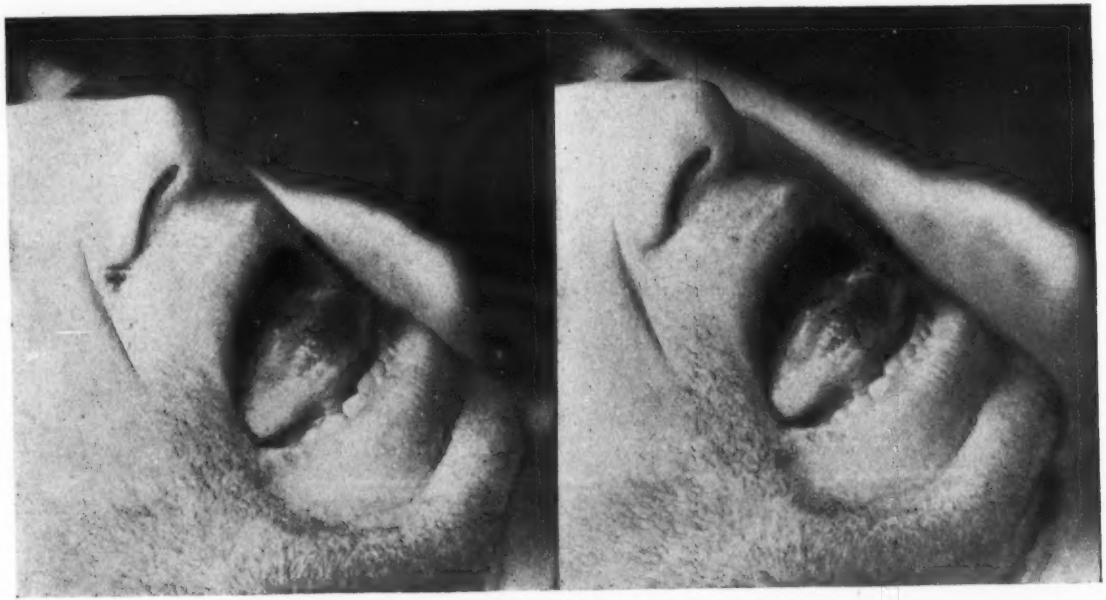


Fig. 23.—Tongue in acute lymphatic leukemia.

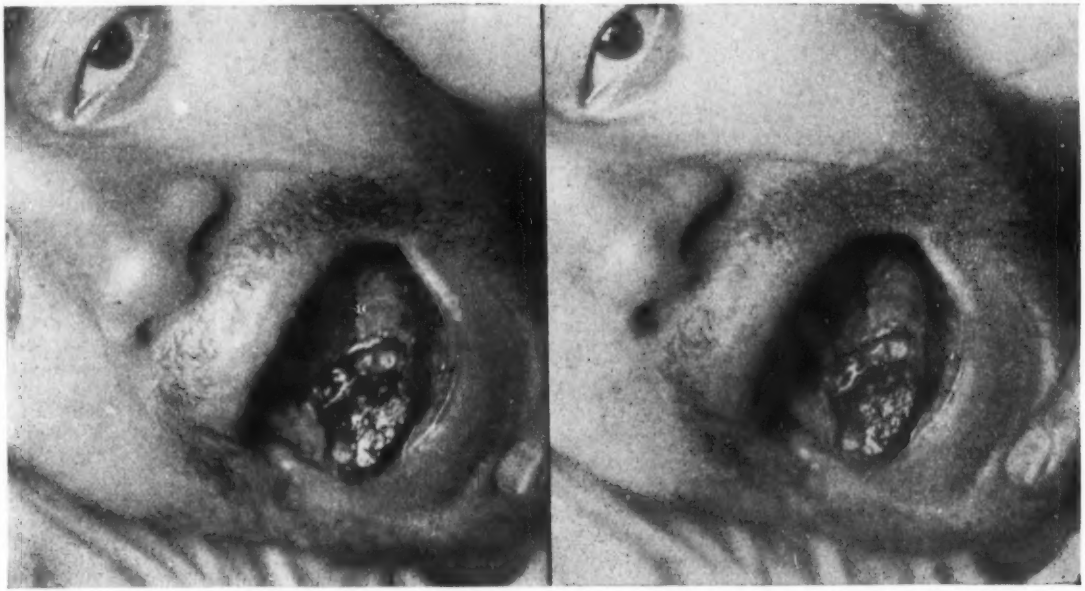


Fig. 24.—Progress of case of acute lymphatic leukemia of the tongue.

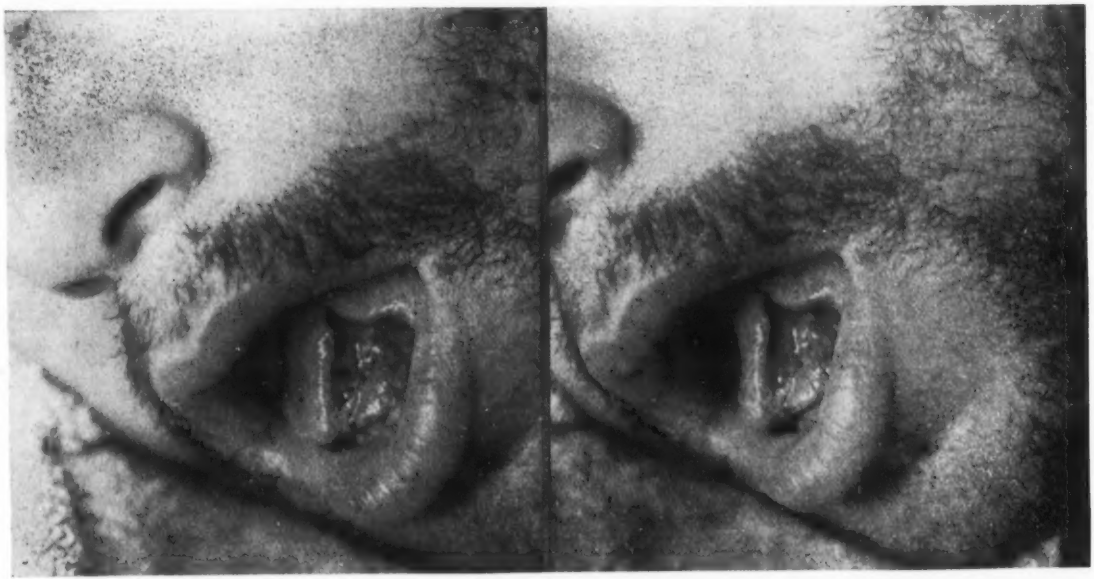


Fig. 25.—Further progress.

Fig. 26.—Still further progress.

Fig. 27.—Unilateral paralysis of the tongue.

Fig. 28.—Unilateral paralysis of the tongue.

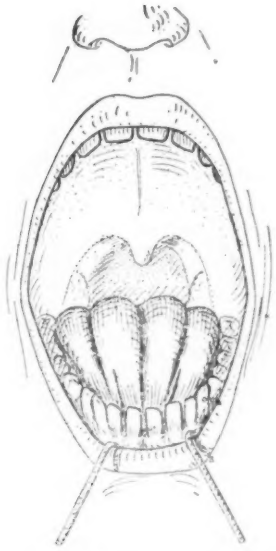


Fig. 29.—Bilateral paralysis of the tongue.

III.

THE SUSCEPTIBILITY TO INFECTION MANIFESTED BY THE REMAINS OF INCOMPLETELY REMOVED TONSILS.*

By Hanau W. Loeb, M. D.,

St. Louis.

Much discussion, verbal and written, has been ventured on the influence of the tonsil in arthritis, nephritis, endocarditis, and kindred processes. In most instances, the tonsil is brought to the bar for indictment and the punishment is assessed on the basis of the utter hopelessness of its conserving any useful purpose whatsoever.

In reference to the remedy, the tonsillectomists have fairly routed the tonsillotomists, as there has been little difficulty in establishing the insufficiency of tonsillotomy. With this phase of the subject this paper is not concerned; it is rather an effort to justify absolute tonsillectomy by showing what may result when the operation is incomplete. In other words, the determination of the operator to perform a tonsillectomy by no means assures an entirely complete operation. This may be due to a number of causes.

1. The operator's technic may be poor. He may make a stab at one of the numerous operations and may leave a fair portion remaining. He may make several attempts at forcing the tonsil through the ring and content himself with the small portion which he happens to snip away. He may undertake a dissection operation and through faulty technic or carelessness fail to remove all of the tonsil.

2. Operative accidents may interfere with the complete removal of the tonsil. Thus, the presence of hemorrhage may hide the portion of the tonsil that remains. This is a common cause to which may be added the timidity of the operator to proceed with any further operative manipulation when the hemorrhage is severe. When the dissection does not uncover

*Read before the American Laryngological Society, May, 1917.

the entire tonsil, the operator may be unaware of the presence of the hidden portion. This is particularly to be noted in connection with the upper pole of the tonsil which often requires a careful dissection to reveal. On the other hand, the lower pole may escape attention by reason of the failure to depress the tongue sufficiently.

3. The very general feeling that if the bulk of the tonsil is removed, the remaining tonsillar tissue will atrophy or, in some pleasing but indefinite way, disappear altogether. This encourages the operator to desist in his work even if it is incomplete—a not uncommon occurrence. However, experience has demonstrated, to me at least, the utter fallacy of this particular premise. If a portion of the tonsillar lymphoid tissue is left after operation, especially if it happens to contain a crypt, it is very much inclined to persist in statu quo. It may never occasion any unpleasant result, but it is present nevertheless with its susceptibility to infection, reduced though it may be. What is considered an atrophied tonsil usually signifies that the tonsil tissue has become somewhat more covered by the anterior pillar and has in part simply disappeared from view.

From the foregoing it will be readily seen that in view of the great popularity of tonsillectomy, there must be a not inconsiderable number in which tonsillar stumps remain even in the practice of the most experienced operators. It is strange, therefore, that there have been so few reports of infection originating in such tonsillar remains.

Crowe, Walker and Rotholz called attention to eight cases of infectious arthritis occurring in the remains of the tonsils after incomplete tonsillectomy. In these cases it was found that the orifices of the crypts had been narrowed, thereby mechanically favoring the occurrence of a general infection. The same authors claim that harmless hypertrophied tonsils may, in this manner, be made susceptible to the influence of general infections.

I myself have met with a number of very interesting cases that bear upon this subject, some of which have occurred after incomplete tonsillectomy performed by me and some by others.

Case 1.—Miss W., nurse, aged eighteen, in April, 1913, was taken with an acute tonsillitis, followed by mild arthritis in

both ankles and one knee joint. Recovery was fairly rapid. There was a history of previous attacks of acute lacunar tonsillitis, but so far as could be ascertained there had been no joint involvement. Her tonsils were removed on May 15, 1913. However, on one side (Fig. 1) there was a small mass of tissue which remained after the operation. Subsequent to this time she had several mild attacks of acute tonsillitis in this small mass remaining, accompanied with acute arthritis and endocarditis. The little mass was removed on June 27, 1914, and since that time there has been no recurrence whatever of the arthritis or endocarditis.

Bacteriologic examination after the first operation showed gram negative staphylococci from both tonsils and no other organisms. From the second specimen there were found diplococci, streptococci and staphylococci.

Case 2 was very similar to the one just reported, with the exception that the patient suffered from endocarditis in addition to arthritis previous to the tonsillectomy. The mass that remained was slightly larger as shown in Figure 2. The first operation was done February 3, 1915, and the second operation April 28, 1915.

Staphylococci were found in both tonsils, and on the left side there were bacilli which grouped like Klebs-Loeffler, but were somewhat thicker and showed a negative Neisser. No streptococci were present.

Case 3 is particularly interesting. Dr. W., aged forty-three, had had a tonsil operation performed in 1898, for the relief of recurring peritonsillar abscesses. After the operation he had had but few attacks. On April 23, 1913, the remains of both tonsils were removed, with the exception of a minute crypt as shown in Figure 3. In February, 1916, this small mass became acutely inflamed, and within a day or so there followed a severe attack of acute arthritis, involving both knees and both ankles, accompanied by acute endocarditis. The attack lasted for over two months: the case is here reported because of the evident relation which existed between the minute remains from the incompletely performed tonsillectomy and the polyarthritis.

Case 4.—A. L. was taken with a very acute and rapidly progressing tonsillitis early in September, 1914, more marked

on the right side. When I was called to see the patient on September 11th, I found that a gangrenous process had already set in, and in addition to the sepsis, he suffered from fairly severe hemorrhages several times a day. Examinations showed a streptococcal infection, with an added Vincent's angina. After very careful attention, he recovered, and on October 22, 1914, I removed both tonsils, completely I thought. As the case went on to resolution, I discovered a single crypt with tonsil tissue equalling a wheat grain in size, on the right side. Since that time, less than four years, he has had six attacks of an acute infection in this crypt, accompanied by pains in the joints, slight nephritis and general depression, all of which leave as soon as the minute abscess which forms is opened.

Case 5 (in the practice of my associate, Dr. Westlake).—V. S., aged twenty-one, had had several attacks of tonsillitis, one of which accompanied by arthritis, occurred two years previously. The patient when first seen, on March 20, 1916, was suffering from a severe attack of polyarthritis, which had been preceded by tonsillitis. Tonsillectomy was performed during the attack on March 27th. The arthritis at once subsided, but she returned three weeks later with a sore throat and soreness in the left ankle. A small stub of the lower pole of the left tonsil, which had been overlooked, was found inflamed. This was removed, and up to the present time, she has no other arthritis symptoms.

These cases definitely show that small masses of tonsil tissue overlooked, or at least not removed at the operation, are susceptible of infection with remote effects similar to those which follow acute tonsil infections.

They must have their counterpart in the practice of other laryngologists, and from my own experience, must be common enough to constitute a fairly definite clinical entity.

They present a decisive argument against any form of operation which does not contemplate the entire removal of the tonsil, especially where there has already been some infective processes originating in the tonsil.

They suggest the advisability of following up cases of tonsillectomy to determine whether any portion remains and whether it has become a focus of infection.

FIGURE 1.

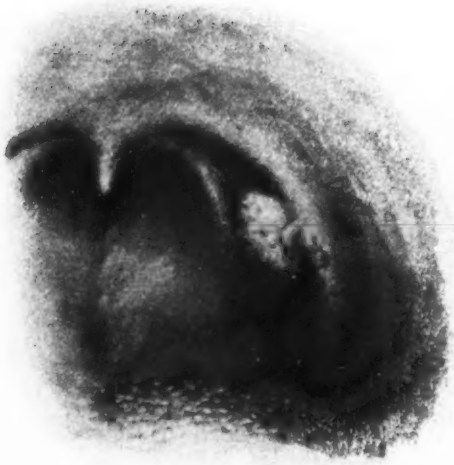


FIGURE 2.

FIGURE 3.

IV.

A METHOD OF MEDICATING EUSTACHIAN BOUGIES.

By Lee M. Hurd, M. D.,

New York City.

The eustachian bougie has been advantageously used for over thirty years to dilate tubal stenosis and to stimulate the lining membrane. Feeling the necessity of medicating the tube at the time of bouginage, several methods have been advanced.

First.—Dipping the bougie into an aqueous solution of silver or iodin. The disadvantage of this method is that the medicament does not stick to the bougie, being rubbed off either in the catheter or at the mouth of the tube.

Second.—Coating the bougie with a heavy base, such as lanolin. This again is as easily rubbed off as the aqueous solutions.

Third.—The use of a wire bougie, such as a Holmes or a Yankauer, wrapped with cotton. This is a much better method, but with the disadvantage that a considerable portion of the solution into which the bougie has been dipped is squeezed out as the bougie advances into the tube, as well as the difficulty of properly adjusting the cotton on the bougie to the size required for the particular tube in question.

The simple method which I have used for fifteen years has the advantage of placing the drug used where you want it, and on the exact size of bougie you wish in the particular case. Celluloid bougies are used, which are coated with silver nitrate, using gum acacia as a base.

Method of Preparation.—In a narrow test tube, make a saturated solution of gum acacia in a water bath, then add the silver nitrate solution from one per cent to ten per cent of the silver as desired. The bougie is dipped about one and one-half inches into this solution, and when the bougie has a uniform coating, it is placed to dry, and then I usually give the bougie a second coating. When dry, the gum acacia and silver

coating looks and feels like varnish to the dry fingers. The silvered bougies can be made up in quantities, and when kept dry, will last fairly well for a week or more.

The one disadvantage of using bougies several days old is, however, that the silver nitrate will gradually oxidize, so that the coated bougies, a week or more old, may have lost half of their silver nitrate per cent. I generally use them the second or third day after preparing them.

Method of Introduction.—A plain gum elastic or celluloid bougie, of the proper size, is passed through the tube to make sure of the position of the catheter, and the size of the bougie the tube will admit, and also to dilate the tube, then the plain bougie is withdrawn and the coated bougie can be readily passed as far as desired and remain there about two minutes to allow the moisture from the membrane to dissolve the gum and deposit the silver where desired, knowing that a definite per cent of the silver nitrate has been deposited. When the bougie is withdrawn, the gum coating will be entirely gone, or only a little stickiness will be felt.

The pathology of the tubal mucosa is practically the same as that of the nasal pharyngeal mucosa, acute congestion, chronic hyperplasia, chronic hypertrophy, etc.

The vast majority of tubal stenosis will readily yield to the use of the unmedicated bougie, but some cases of hyperplasia and hypertrophy relapse to their former condition, and the plain bougie fails, then the bougie varnished with gum acacia and silver nitrate will reduce the swelling.

Results.—One or four per cent is usually strong enough to contract the membrane, if not, the strength can be increased up to ten per cent. The stronger per cents should be used cautiously if it is necessary to pass the coated bougie beyond the isthmus, as several times I have produced a serous exudate which drained into the tympanum, producing tinnitis and diminishing the hearing for several days.

I have never had pus form in the middle ear, nor had to incise the drum membrane for the relief of the exudate.

The weaked silver nitrate per cents produce no discomfort, but sometimes the stronger per cents will give annoyances and

also cause some pain, referred to the ear, similar to the discomfort produced in the nose by ten per cent of silver nitrate.

Ultimate results naturally vary. Some tubes remain perfectly patent, while others relapse after a time, and require a repetition of the treatment.

15 East 48th Street.

V.

TO DETERMINE THE LOCATION OF THE LATERAL SINUS FROM EXTERNAL MARKINGS. ALSO, THE APPROACH TO THE MASTOID ANTRUM, AS MODIFIED BY SURFACE MARKINGS.

By H. J. Prentiss, M. D.,

Iowa City, Iowa.

Lateral Sinus Determination.—This may be approximated by determining the position of the supramastoid crest —i. e., third root of the zygoma. The supramastoid crest probably is developed along the lateral suture line, between the squamosa and petromastoid bone (Figures 1 and 2). The reason is that the temporal muscle, in part, arises from the squamosa, and so, due to the tug of this muscle, at this suture line apparently is developed the crest. This suture line determines the position of the anterior superior surface of the petrosa, and therefore the supramastoid crest does the same thing (Figures 3 and 4).

If the supramastoid crest changes its course markedly from that of the zygomatic arch, so that it runs obliquely upwards (Figure 5), it indicates that the anterior superior surface of the petrosa is approximating the vertical, rather than the horizontal plane, and therefore the same is true of the posterior superior surface of the petrosa. If, conversely, the supramastoid crest continues backward the line of the zygomatic arch, so that it approximates the horizontal (Figure 6), it indicates that the anterior superior surface of the petrosa is approximating the horizontal rather than the vertical. The same is true of the posterior superior surface. In the first case the lateral or transverse sinus, in making its turn at the sigmoid groove, on the posterior superior surface, only encroaches slightly, because of the high placed surface (Figure 5). In the second case the sinus has to encroach markedly on the bone,

to make the turn, so as to keep the lumen of the sinus intact (Figure 6).

Therefore, a very obliquely placed crest indicates that the sinus is well posterior to the field of approach to the antrum (Figure 5), and a horizontally placed crest indicates that the sinus is close to the field of operation (Figure 6). (See X-ray pictures.)

Modifications.—The external auditory meatus varies. It may run in from the cortex at a very oblique angle, running inwards and forwards, or it may run at a right angle to the cortex. In the first case, since the approach parallels the meatus, it keeps away from the sinus (Figure 8). In the second case it approaches the sinus (Figure 7).

Again the lateral sinus on one side may be small. Here the danger of exposure of the sinus is lessened.

Variations in Approaching the Antrum.—The antrum is in the horizontal plane with the attic, and therefore is above but posterior to the upper wall of the external auditory meatus. This relation does not vary. What does vary is the depth of the middle cerebral fossa. We have seen that the supramastoid crest indicates the petrous portion of this fossa. This crest varies in its position to the external opening of the external auditory canal. It may run backwards well above this canal, or run backwards just tangent to the canal (Figures 9 and 10). In the first case (Figure 9), the cone of approach may be made with little likelihood of exposing the meninges. Here we do not have to consider the triangle of election or McEwen's triangle, but can cut away the bone above the crest, owing to the inner table shelving away.

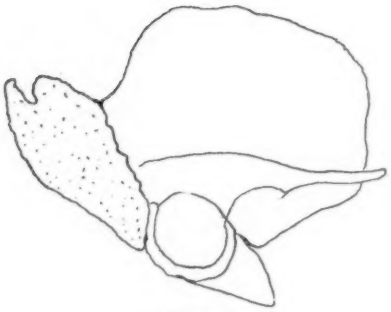
In the second case (Figure 10) the approach must be made well below the crest and even in the horizontal plane of the meatus. The apex of the cone of approach, however, must always point upwards to reach the antrum which, as has been pointed out, is above but posterior to the meatus. If we went horizontally inwards we would miss the antrum, but hit the vertical part of the seventh cranial nerve, which as is known turns downwards in the floor of the aditus.

The position of the antrum in the low placed crest may be emphasized by making a horizontal line a trifle above the meatus and backwards. The depth to the antrum may be

determined by ascertaining the depth of the meatus. The distance to the antrum cannot exceed the depth of the meatus, as the middle ear approaches the cortex as it passes backwards (Figure 11).

Any temporal bone may present all combinations of these variations.

This department has two cases of impossible approach to the antrum via the cortex. Here the temporal fossa reaches so far backwards and the sinus so far forwards, that the petrous bone between the antrum and the cortex presents a thin plate of bone, so that the operator will immediately expose the fossa or sinus, or both.



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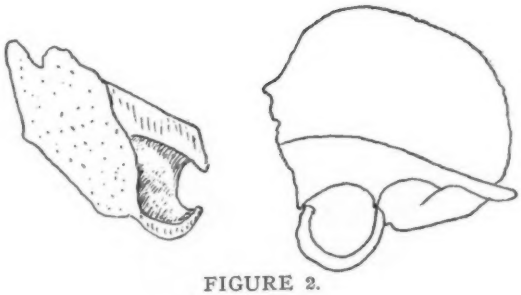

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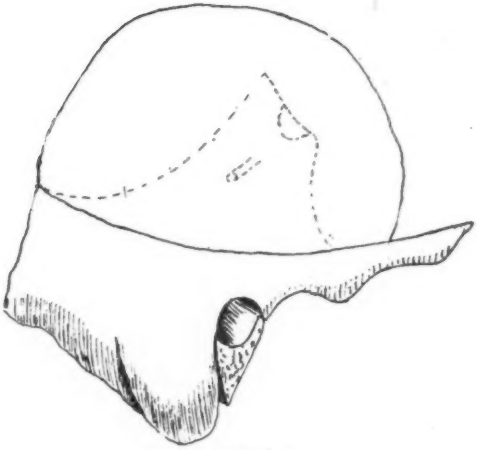

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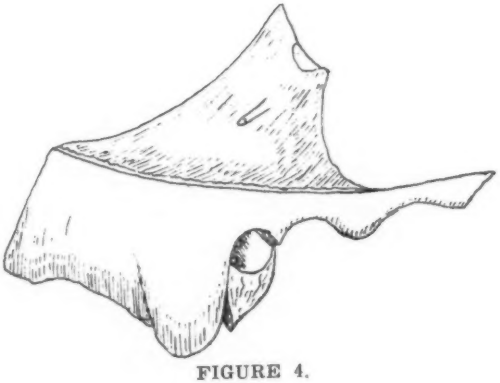

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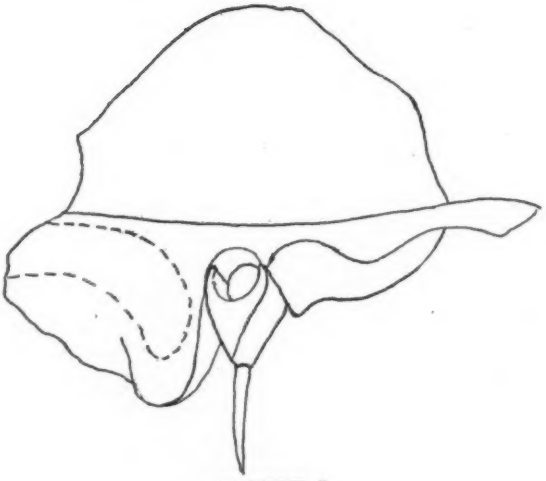

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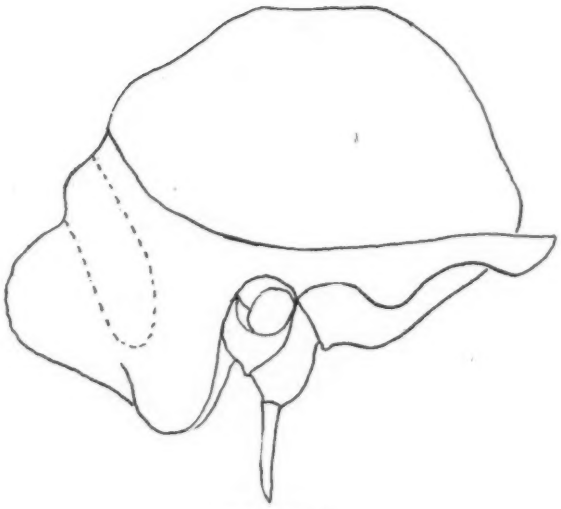

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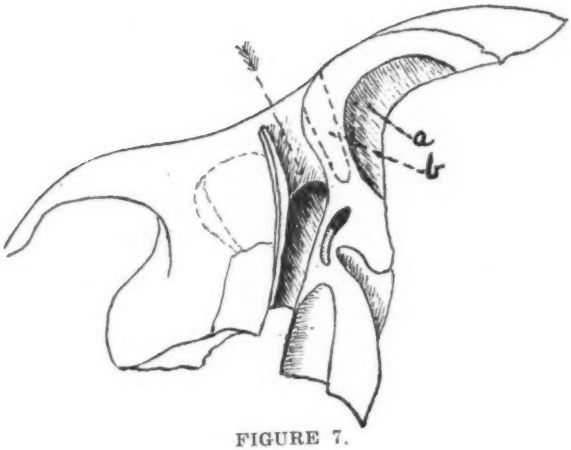

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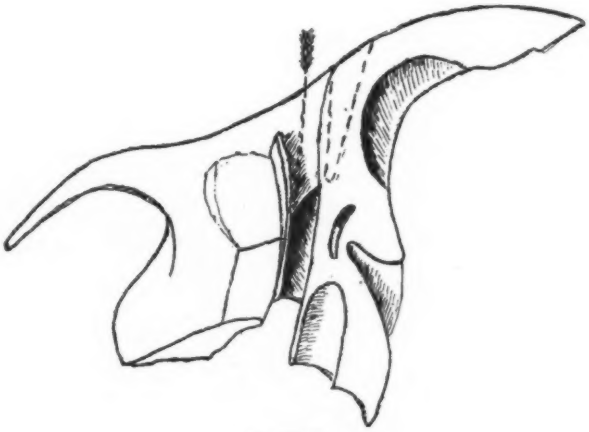

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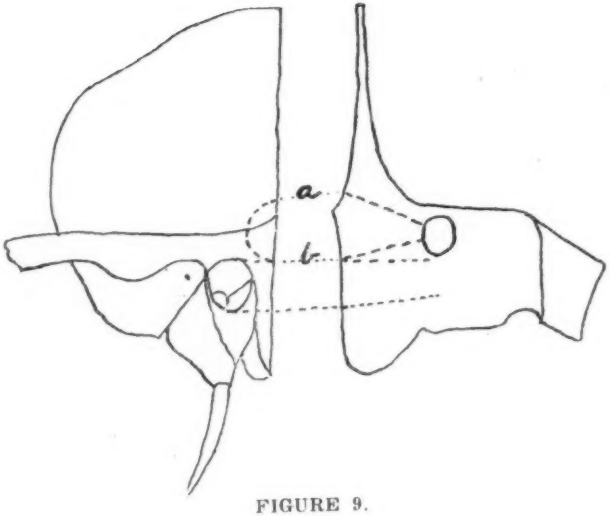

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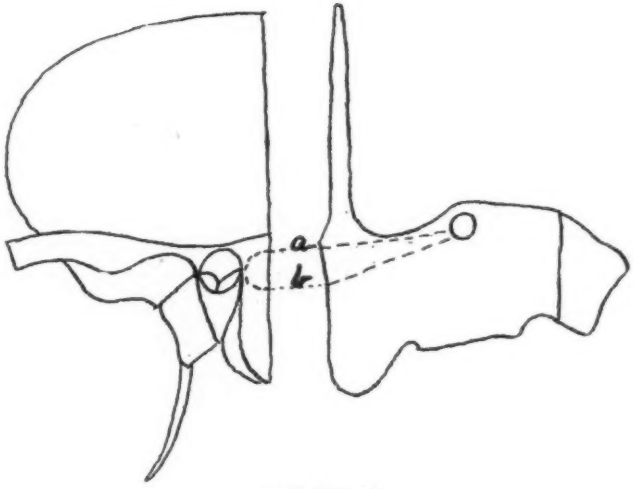

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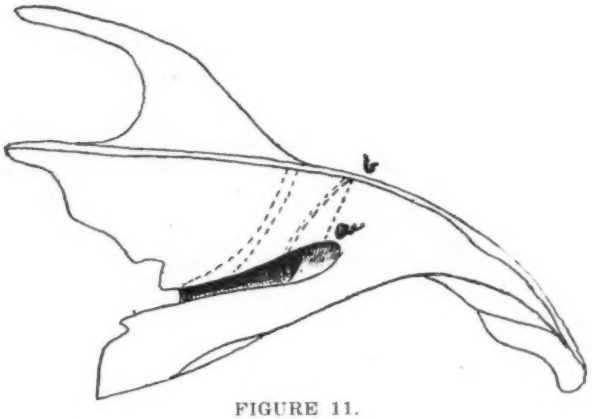

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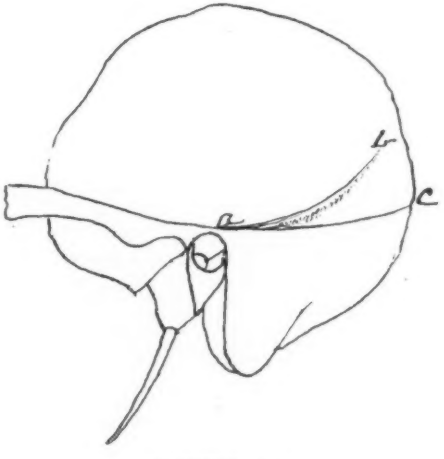

FIGURE 12.

FIGURE 13.

VI.

THE OCCURRENCE OF NODULES OF CARTILAGE IN THE TONSIL.

By Jonathan Forman, M. D.,

(from the laboratory of pathology of the ohio state university),

The occasional occurrence of small islands of cartilage and bone in the tonsil has been reported by a number of observers.

In the majority of instances the bone was thought to have developed from the cartilage. As to the origin of the cartilage, two main theories have been advanced. The first theory explains the presence of the cartilage as having developed from the stimulation and growth of a fetal rest or misplacement. This agrees with the fact that this cartilage appears in a region wherein the embryo cartilage is very abundant. The second explanation is that cartilage is developed from the connective tissue by metaplasia. It is thought that this transformation is brought about by the presence of an inflammatory process.

For an excellent review of the literature and a resumé of the evidence for these two theories, the reader is referred to the recent paper by Cary.[1]

Maclachlan[7] in careful and painstaking study of over three hundred and fifty pairs of tonsils collected at Mercy Hospital of Pittsburg, found eleven specimens containing cartilage. Reitman,[11] in a series of fifty cases which included all ages, found cartilage present in the tonsil in thirty-four per cent. Ruckert[12] obtained about the same percentage in infants. Lubarsch[6] found islands of cartilage in sixteen per cent of four hundred and twelve cases. This year in the examination of two hundred and ninety consecutive pairs of tonsils in this laboratory, only one specimen was found to contain cartilage. This is a much smaller percentage than those given above. Still, judging from the extent of this literature, it

may not be an unusual series on this account. The percentage of tuberculosis in this series is low—approximately 0.5 per cent. Lubarsch's series contained a goodly number of tuberculosis. Maclachlan found cartilage associated with tuberculosis in two of his eleven specimens. Possibly this is a factor at work in our series.

Our specimen occurred in a girl aged fourteen who gave a history of chronic tonsillitis. The right tonsil appeared hypertrophied. The left tonsil was somewhat smaller and was removed with greater difficulty.

There are seven distinct islands of cartilage in the connective tissue of the capsule and trabeculæ of the left tonsil. These areas of cartilage seem to blend with the connective tissue in such a manner as not to offer any suggestion of a perichondrium. There are no areas of ossification. In addition to this cartilage formation, the tonsil presents keratinization of its epithelium, the accumulation of lymphoid cells and leucocytes in the crypts and partial fibrosis of the lymphoid tissue.

The tonsil of the opposite side contains no bone or cartilage, although practically the whole organ has been sectioned serially. It presents the picture of a distinctly hypertrophied tonsil.

So far as this specimen is concerned, an explanation for the occurrence of cartilage in the tonsil would appear to be a metaplasia of connective tissue which had a certain aptitude for chondrofication. The evidence which points to the metaplastic nature may be briefly summarized as follows:

(1) There is a fibrosis of the tonsil; (2) One tonsil is alone involved, and it is the one presenting the most evidence of chronic inflammation; (3) Cartilage is found only in the connective tissue of the capsule and trabeculæ; (4) The continuity of the cartilage with the connective tissue.

Many of the specimens, however, reported by other observers do not fit so nicely into the theory of metaplasia. In fact, neither the embryonal nor metaplastic theory appear to cover all of the specimens described. The best statement of the situation would, therefore, appear to be that of Cary. The best explanation of "the origin of cartilaginous and bony nod-

ules in the tonsil and one which meets the conditions described by the various writers is that, as Ziegler expressed it, we have embryonal rests and especial chondro- and osteoplastic aptitude of the connective tissue cells in this region."

SUMMARY.

In this specimen, there is a unilateral deposit of cartilage, associated with the repair (replacement fibrosis) of a chronic inflammatory lesion, occurring in a region where embryonic rests are frequently found and where the connective tissue may have an especial chondroplastic aptitude.

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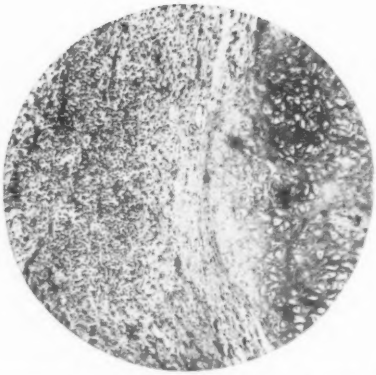


Figure 1.—Showing the fibrosis of the tonsil and the island of cartilage in the adjacent capsule.

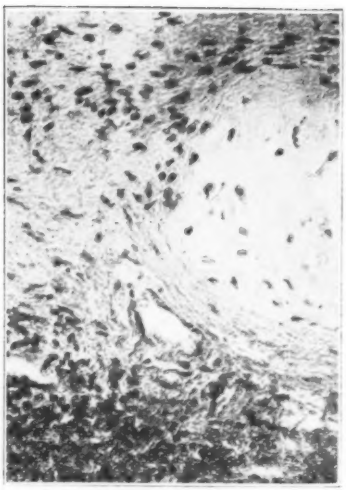


Figure 2.—Showing the blending of the cartilage with the connective tissue of the capsule.

VII.

A NEW OPERATION FOR COLLAPSED ALAE NASI.*

By Oscar Wilkinson, A. M., M. D.,

Washington.

The following operation I have performed in four different cases, all with perfect results, both as to cosmetics and function of the nose.

I first did a submucous resection in the middle portion of the septal cartilage, taking out as much as one centimeter square of this cartilage. This is placed in a warm saline solution and left there until needed. After thoroughly anesthetizing the lower portion of that side of the nostril to be operated upon, an incision, AB as per drawing, is made in the floor of the nose, cutting down through the muscle and well out onto the skin. From B in the drawing an incision is made up the septum through the skin down to the cartilage. This incision should be at least one centimeter long and extend to the point C in drawing.

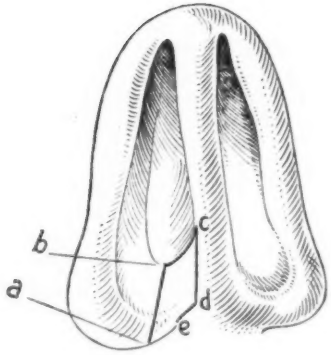
From the point C a horizontal incision is made along the septal mucosa forward to the skin surface, to the point D in the drawing. From D an incision is made to the point E. This flap is now dissected up from the line BC forwards, and this dissection should include not only the skin but the subdermal tissue.

The flap should be dissected well in advance of the letter E, so as to make it possible to turn this flap one-fourth of a turn. The line BC of the flap is now turned one-fourth of an angle around and stitched to the line AB, whereas the line CD of the flap is stitched to the line BC of the original incision.

Before drawing taut and tying the stitches the septal cartilage is taken from the salt solution, pared off with scissors to a suitable size, and inserted beneath the flap, after which the sutures are tied.

The only after defect to be noticed in this operation is the raw surface produced from D to E by turning of the flap, and the rather wide-open nostrils for the first few weeks, both of which conditions are soon relieved by the dermatization of the bare space at point D, and a slight contraction of the scar tissue.

1408 L Street, N. W.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VIII.

REPORT OF A CASE OF PURULENT LEPTOMENINGITIS OF OTITIC ORIGIN.*

By Daniel Layman, M. D.,

Indianapolis, Ind.

I was called hurriedly on the afternoon of November 27, 1916, to see a patient in a comatose state. I was called because she was not responding to medical treatment and her physician thought the ear might have something to do with her condition. On my arrival, the only history obtainable was that Mrs. K., aged twenty-three, had been in a semicomatose state for the last three days. Her illness commenced about two weeks before with cold, followed by headache over the right side of her head. The headache became most pronounced, so intense that there was noticeable some mental disturbance. There was also a history of some nausea and vomiting.

Examination showed a well-nourished woman lying in bed comatose. She could be roused only with difficulty, and showed distinct evidence of acute, marked meningitis—temperature 103, pulse 125.

Examination of the ears showed slight moisture over both drum membranes. When wiped with a cotton probe distinct foul odor was noticeable, more marked in the right ear. Marginal perforation posteriorly, posterior superior wall bulging. On account of the meningitis and the serious condition of the patient I asked for a consultation with a neurologist to substantiate the diagnosis and consider with him whether or not an operation would be advisable. Dr. Neu was called, and his report is as follows:

"Complexion, sandy; rather fleshy; lying in bed; comatose. Patient can be roused and understands simple requests, but immediately relapses into unconsciousness, performing acts

*Read before the meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, held at Columbus, Ohio, February 26, 1917.

somewhat automatically. Skin is dry and rough; mouth dry; temperature, 103; pulse, 120; respirations, 20. Shows marked cervical rigidity; pupils reacting to light; Kernig's sign on both sides, more marked on the right. Babinsky on left only; choking of both optic discs. An unsuccessful attempt was made to withdraw some cerebrospinal fluid. Later, while on the operating table, lumbar puncture gave a fluid with greatly increased pressure, turbid, slightly greenish yellow color, with considerable cellular deposit on standing. Microscopically, the deposit consisted of mononuclear and polynuclear cells more or less degenerated and occasional diplococci, probably pneumococcic."

The usual radical operation on right mastoid with an exposure and drainage of the dura in the middle fossa was determined upon, taking into consideration also surgical drainage of meninges on left side. The mastoid throughout was found sclerosed, apparently eburnated throughout, and the cells contained some pus. The exenteration was done slowly, because of the hardness of the bone and the close approximation of the lateral sinus to the antrum, which was deeply seated and small. The roof of the antrum was found necrosed and broken down, and on enlarging the opening a small epidural abscess was encountered and cerebrospinal fluid in which there was pulsation. A segment of the squamous portion of the temporal bone was removed over an area about one inch and a half by one inch to expose the dura over the temporosphenoidal lobe. There was evidence of intradural pressure and an inflamed dura, especially over that portion of the dura contiguous to the antrum tegmen. A semicircular incision was made through the dura, and drainage instituted by gutta percha drains, inserted fan-like, well up between the dura and skull, especially in the subtemporal region; i. e., beneath the dura along the petrous portion of the temporal bone. At this stage of the operation Dr. Neu made a lumbar puncture, and withdrew a creamy turbid fluid, the report of which has been given above. I did not do a radical, on account of the serious condition of the patient. The hurry-up sign was hoisted and I felt that something might go wrong in attempting fast work in a sclerosed mastoid and a lateral sinus jammed up against the

antrum, thus jeopardizing the patient's chances of recovery, as Dr. Crocket states that "every minute over fifteen minutes for this operative procedure counts materially against the patient's chance of recovery," and I had already exceeded the time limit.

Convalescence was slow; both the constitutional and local symptoms subsided gradually, with the exception of headache, which was rather severe for several days, being especially pronounced on the sixth day after the operation, when also a rise of two degrees of temperature occurred. It was necessary to change the outer dressings every day for a few days, as they were soaked with cerebrospinal fluid. The first complete dressing was made on the fourth day, but the subtemporal drainage was not removed until the second dressing on the fifth day. The patient was up and out of bed three weeks after the operation.

Dr. Neu's report of examination of patient two days after operation is as follows:

"Spinal fluid with pressure still increased, but less so than previously—clearer, transparent, slightly fibrillated clot after standing several hours; the number of cells greatly reduced. Reduced Fehling's solution, slight increased protein content. The cervical rigidity was less marked. Kernig's sign was scarcely noticeable. There was still pain in the head, mostly over the area of operation. Patient had regained consciousness. Pulse, temperature and respiration were practically normal; optic discs still showed choking, the right more than the left."

Subsequent to the operation the following history was elicited from the patient. Had recurrent discharge from ears, dating back and persisting since early childhood. Discharge from right ear had been bloody and of foul odor the last few years, and up to within a few weeks of her illness.

Careful treatment at the time of each dressing of mastoid and cranial wounds stopped the discharge from the ear altogether before the wounds were completely healed.

Cases of purulent meningitis recoveries after operation have been reported by American otologists during the last decade. However, these cures were not due to any well established and recognized method of operative procedure.

Of special interest are the series of cases and method of treatment reported by Dr. Crocket, of Boston, at the (1916) annual meeting of the American Rhinological, Laryngological and Otological Society, held at White Sulphur Springs, Va.

I tried to carry out the surgical technic as laid down by Dr. Crocket. As I had not read his report of the two cases of recovery in the transactions which had not been received, some of the details were overlooked. However, the essentials of my technic were as he had outlined—i. e., one and one-half inch opening of the dura made at the bottom of the bone opening, and insertion of the subtemporal drain along the top of the petrous portion of the temporal bone. Dr. Crocket recommends that the lumbar puncture be made previous to making the dura opening, as the amount of pressure in the brain can be gauged by the finger tip pressed against the dura, this grading the amount of fluid withdrawn.

Whenever this important subject is discussed some otologists put themselves on record as not having seen a case of purulent meningitis recover after operation. I had not, until this case, and notwithstanding the reports regarding self limitation and spontaneous recovery in diffuse purulent meningitis, I give credit for the cure of this patient to the method proposed by Dr. Crocket. I look for more favorable results in the future in the cases operated early with this improved surgical technic.

IX.

REPORT OF CASES OF BILATERAL ABDUCTOR PARALYSIS OF THE VOCAL CORDS.*

By Ralph Butler, M. D.

Although these cases are not very rare, each one may present a wide and interesting field for investigation of the etiologic factors involved. Moreover, in recent years, such a large proportion of papers and case reports have dealt with the important subjects of endoscopy, diseases of the accessory sinuses and tonsils, and new surgical procedures, that the writer felt that it might be worth while to call the attention of the Association to this subject.

Case 1.—E. R., aged eleven years, presented himself at my office November 16, 1916, complaining of dyspnea and noisy breathing, with exacerbations of symptoms at irregular intervals—i. e., daily, weekly, or once in several weeks. These exacerbations were precipitated by reading or writing, but often occurred during sleep.

The attacks began with a short cough or two, followed by inability to breathe, cyanosis and occasionally unconsciousness for a minute or two, and terminated with the expectoration of mucus. After the attack he was unusually nervous and irritable, and occasionally he did not know that it had occurred. His breathing was usually audible but worse at times, especially at night when it could be heard from the adjoining room. His voice was weak, and he cleared his throat with difficulty.

Examination of his nose and throat showed a slight subacute nasopharyngitis, a moderate backward tilting of the epiglottis with the vocal cords in the median line, both on phonation and inspiration. Because of the position of the epiglottis and the irritability of the patient, it was impossible to see the cords during quiet respiration, but the moderately high-pitched stridor was constant.

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*Read before the American Laryngological Association at Atlantic City, N. J., May 29, 1917.

Family History.—The father contracted syphilis five years before the birth of this child, and a recent examination of his blood gave a positive Wassermann. The mother appeared healthy, and one year ago her blood showed a negative Wassermann. There have been three pregnancies. The first child was born at term, but only lived a few days, during which time it had many convulsions. The second is the subject of this report. The third, one year old, was healthy and showed a negative Wassermann of the blood.

Personal History.—The case under discussion had blebs on his hands and feet for several days after birth, and the attending physician prescribed inunctions. He has had no convulsions nor loss of power in his extremities.

Dr. Theodore Le Boutillier reports that he has treated the patient since he was four months old, at which time he was a perfectly normal, healthy baby. There was a slight thickening of the anal folds, but not enough to call a true condyloma. He had measles, whooping-cough and chicken-pox.

At five years of age there was a swelling of the right thigh which was thought to be tubercular, but it cleared up rapidly after incision. At six years he developed ptosis of the right eyelid, with internal strabismus and dyspnea. At this time Dr. M. F. Butler made several examinations of the larynx and always found the cords in adduction. Examination of his blood showed the Wassermann to be four plus. He had three doses of salvarsan, and within a few months the Wassermann was reduced to "slightly positive" and the ptosis and dyspnea disappeared. A year later (1913), the ptosis recurred. In September, 1915, the dyspnea recurred and has been present ever since. Several X-ray examinations of the chest have been made with negative results.

The parents object to a direct examination of the larynx and trachea, and it has not seemed advisable to urge it on account of the extreme irritability of the child.

During the six months that he has been under my observation, the nasopharyngitis has disappeared, but the cords remain in the same position, except that there is a very slight abduction of the left cord during inspiration and the paroxysms occur less frequently. He has been on mercurials and iodids

intermittently since six years of age, and developed normally until a year ago, since which time he has lost eleven pounds.

Neurologic Report, April 19, 1917, by Dr. N. S. Yawger: The child is intelligent but impetuous and irritable. The gait is normal and he is slightly ataxic with the eyes closed. There is paresis of the right external rectus muscle. The pupils are dilated equally, irresponsive to light and in accommodation. The upper extremities are slightly ataxic, and the muscular power is fair. The biceps and triceps jerks are absent on the two sides. There are no sensory changes. In the lower extremities the muscular power is fair, and the patellar jerks are absent. There is no Babinski on either side and there is no clonus. There are no sensory changes. The abdominal and cremasteric reflexes are present on both sides. The bladder and rectum are continent. There are subjective pains at times in the arms and legs. The handwriting is normal. So far there appears to have been no syphilitic involvement of the brain or cord. The muscular atrophy is uniform and is due to the general debility.

The child at present does not have the symptoms of tabes dorsalis, though there is a later possibility. We know that tabes is a common cause of this form of paralysis and that it may be confined to the abductors for years before the development of unquestionable symptoms of locomotor ataxia.

Gordon states that juvenile tabes has been seen in very young individuals, and even in children of nine years, although only one case is on record with necropsy. Hereditary syphilis can always be traced in the family history, and the Wassermann reaction is positive in a much larger proportion than in adults.

Diagnosis.—The child has congenital syphilitic cerebrospinal meningitis. The ocular paresis results from cerebral meningitis. The abductor paralysis may be due to luetic changes in the recurrent laryngeal nerves.

Case 2.—On January 23, 1917, I was called to see a patient who had just been admitted to the Polyclinic Hospital with rather urgent dyspnea. I found a somewhat emaciated Jew

with labored breathing, an anxious expression and slight cyanosis.

Examination of the larynx showed both cords dark red and slightly thickened. The left was immobile in the median line, the right abducted slightly on inspiration. He could not swallow solids, but could swallow liquids with difficulty. The dyspnea was not sufficient to demand surgical interference, but the house doctor was directed to be ready for an immediate tracheotomy.

The following history was obtained: He was born in Russia sixty-two years ago. He has five children living and well. Three died when young, from unknown causes. There was nothing in the history to suggest clues. The only sickness he recalled occurred when he was thirty years old, lasted two months, and was supposed to have been typhoid. Although he worked steadily as a shoemaker, he was never robust and for many years, possibly since the attack of typhoid, he had been troubled with slight dyspnea when lifting or in the recumbent posture. About five months ago he began to notice an increase in the dyspnea, especially at night, and it was accompanied by pain in the throat and by dysphagia. These symptoms gradually increased until the latter part of last December, when he was admitted to the Hospital of the University of Pennsylvania, under the care of Dr. Husik, who reports that a view of the cords was not obtainable on account of edema of the larynx, that he could not swallow and breathed with much difficulty. The Wassermann test of the blood was made twice, and was negative. His condition improved, and after one month he left the hospital. Ten days later he was admitted to the Polyclinic Hospital, as noted above.

After two weeks of rest in bed, with strophanthus for his weakened heart, his general condition, breathing and swallowing improved. He was then examined under local anesthesia by the direct method, and the trachea showed a bilateral narrowing about three inches below the cords which were then slightly further apart, the right moving more than at the first examination. The stenosis seemed to be produced by pressure on both sides of the trachea and presented a cleft about five

millimeters wide, extending anteroposteriorly. The mouth of the gullet was constricted.

The fluoroscope showed a large growth, mostly on the right side of the trachea, extending from above the clavicle to the third or fourth dorsal vertebra. It did not pulsate.

February 29, 1917.—The physical examination shows the eyeballs small, pupils equal and reacting poorly to light and accommodation. The tongue is coated, many teeth are missing, and there is a slight enlargement of the thyroid gland, especially on the right. In the center and over the left clavicle are found small nodules attached to the thyroid. The veins are slightly distended. The right side of the chest is larger than the left. The heart is rapid, not enlarged, and the first sound at the apex is impaired. There is slight anterior curvature of the spine. The breathing in the supraspinatous fossæ is harsh on the left and feeble on the right. The sputum is negative for tubercle bacilli. The extremities are emaciated. The liver and spleen are not enlarged. There is no edema of the legs, and the knee jerks are feeble.

Provisional Diagnosis.—Carcinoma of the thyroid gland. After five weeks of rest in the hospital, he was strong enough to go home and report to the dispensary for treatment. His dysphagia and breathing were distinctly better, the right cord abducting as far as the cadaveric position and the left cord showed some bowing. Notwithstanding the three negative Wassermann tests, he was placed on mixed treatment for one week and inunctions for two weeks and gained eight pounds.

At this time the radiogram showed that the growth had decreased one-third in width. Three weeks later the roentgenologist reported that it was much smaller and that the oesophagus was displaced slightly to the left. The growth moved on swallowing and with the heart beats, but did not expand as an aneurism. The mediastinal glands were still enlarged.

May 4, 1917. The patient is still taking a tonic and inunctions of mercury, and his weight has increased fourteen pounds. He sleeps well and has no pain and no stridor even on exertion, but there is slight dyspnea on climbing stairs or rapid walking. He breathes more easily when in the upright position and with the head slightly forward. The voice is clear

but rather weak and tires easily. The abduction of the cords is incomplete. Beginning with the first ring, the trachea is compressed bilaterally to three or four millimeters, the upper rings being plainly visible. As the tube passes further down the outline of the rings disappears, the mucous membrane being thickened and reddened, the lumen smaller and on reaching the level of the aorta the aspect changes in that there is a posterior bulging into the lumen, changing its shape to that of a crescent and reducing it to about the thickness of heavy writing paper. The bulging portion is deep red, and pulsates synchronously with the heart beat. It seems unsafe to force the tube by this obstruction. Considering the almost complete occlusion of the trachea, it is remarkable that there is so little dyspnea. The nodules in the neck are small and do not seem to be growing. This case illustrates the possibility of both a laryngeal and tracheal stenosis occurring in the same individual.

I wish to refer briefly to a third case which I report from memory. Several years ago I was asked to see a woman about forty years of age, who had been operated upon for a very large thyroid gland. She was scarcely out of ether and was suffering from considerable dyspnea with some cyanosis.

An examination with the laryngeal mirror showed both cords in the median line with no movement except a slight flapping of the edges on breathing. I suggested a tracheotomy, but the operator said it could be easily and quickly done through the thyroid wound and decided to wait. A few hours later, the dyspnea became more urgent and a tracheotomy was decided upon, but on changing the patient from the sitting to the recumbent position, she succumbed in spite of a hurried tracheotomy, demonstrating the too frequent error of postponing tracheotomy until the patient is almost exhausted.

A comparison of the symptoms in these three cases illustrates the variation in the severity of the dyspnea, depending upon the rapidity of the onset of the paralysis. Although the first two cases are in danger of death from asphyxia, they have been able to go about for many months with relatively little discomfort from obstructions which are little if any less

than that which was fatal to the postoperative case in which the paralysis was very rapid in its appearance. Bert believes the greater mortality from sudden obstruction is due to reflex paralysis of the respiratory centers through irritation of the laryngeal nerves and Krieger maintains that it is due to irritation of the cardiac branches of the vagus.

1926 Chestnut Street.

X.

REMOTE RESULTS OF FOCI OF INFECTION IN THE NOSE AND THROAT.*

By Joseph B. Greene, M. D.,

In selecting this subject it is fully realized that nothing new and startling is being offered—in fact, it may seem a bit trite, but yet so great is its importance that one may be pardoned for repeating much that has been said by others. However, there are certain phases of this subject that have not been sufficiently emphasized, and which will bear repetition at this time. There is no question that a great majority of the foci of infection causing local and systemic disease occur in some part of the head, yet we must not ignore other infecting areas of the body, as the gall bladder, appendix, prostate glands and seminal vesicles, pus tubes, infected bronchi, etc. The fact that so many infecting foci occur in the field embraced in our specialty places a great obligation upon us, not only to search with painstaking care every possible area of infection within the field of our special work, but also to inform the profession in general of the great danger lurking in the cavities and crypts of the nose and throat. The teeth and the alveolar processes, and the middle ear and mastoid cells, while not strictly coming within the scope of this paper, will on account of their intimate relationship be necessarily referred to but not discussed at length. It is a well known fact that the tonsils may receive their infection from an infected nasal sinus or from a pus pocket around a tooth (pyorrea alveolaris). Then again the sequence of an infection of the middle ear or a mastoid from an acute sinuitis or an acute tonsillitis is one of the most frequent in our experience. The teeth with the adjacent tissues and bony processes may contain hidden foci which are difficult to locate, and which frequently require the aid not only of a dentist, but also the services of a competent roentgenologist. Our work is becoming

*Candidate's thesis for membership in the American Laryngological Association, May, 1917.

so concentrated, and so much is demanded of us in the way of accuracy of diagnosis that medical men no longer stand alone, but must work in closer cooperation with others engaged in special lines of work. There is no place where "team work" counts more for the patient's good than in fathoming a hidden focus of infection which is causing some serious local or systemic disturbance. A competent, up-to-date dentist who is able correctly to interpret X-ray findings can be of the greatest help in reaching a correct diagnosis. While those who live in smaller cities may lack some of the laboratory facilities afforded by the larger medical centers, they can, by grouping themselves with careful workers in other fields of medicine and dentistry, do much to locate hidden foci of infection. In this way only can we in these difficult cases merit the reward and satisfaction which comes from rendering our patient the greatest possible service in ridding him of the immediate causes of some local or systemic disease. In the majority of cases these patients first fall into the hands of the family physician or the general diagnostician, and we are called upon to render judgment in our own field of work. Our task is often a difficult one, for we are at times unable to say that the small sinuses of the head and deep crypts of the tonsils are free from infection. There are, however, certain symptoms and physical evidences which tend to convict these areas of playing a rôle in the systemic infection. Of this, more will be said later. The work of the dentist is a bit easier, for in the majority of cases a close examination of the teeth and the gum margins, together with a careful X-ray film of the alveolar processes, should reveal evidence of dental trouble. Certain rare forms of granuloma may not show on the film.

The question of focal infection as a factor in producing systemic disease is not new, for members of our profession have been diligent in urging its importance for a number of years. However, it is only within the last decade that the medical profession has begun to fully appreciate its importance. The close relationship of acute rheumatic fever, endocarditis, and chorea to acute tonsillitis was early recognized. Some writers, however, failed to interpret the relationship of these symptoms to the source in the tonsils, as was evidenced by the term "rheumatic sore throat." Even now we occasionally hear the

laity use this misleading term. It is worthy of note that Osler, who has been a leader and pioneer in everything affecting internal medicine, in the second edition (1897) of his Practice of Medicine offered these theories as to the cause of rheumatic fever: (1) The metabolic, (2) the nervous, and (3) the germ theory. Although he leaned to the germ theory at that time as to the causation, yet he speaks of the inconstancy of the microorganism found in the disease. In a later edition he classes acute rheumatic fever among the "Specific Infectious Diseases," instead of the "Constitutional Diseases." It is interesting to note in this early edition of Osler's Practice of Medicine (1897), the accuracy with which he describes the pathology of chorea as expressed in the following statement:

"Embolism of the smaller cerebral vessels has been found, as might be expected, in a disease with which endocarditis is so frequently associated; and, based upon this fact, Kirkes and others have supported what is known as the embolic theory of the disease." He says, further, in reference to the microbic origin of the disease, that "In favor of this view it has been urged, as it is impossible to refer the chorea to endocarditis, or the endocarditis in all cases to rheumatism, that both have their origin in a common source, some infectious agent which is capable also in persons of exciting articular disease." It is noted that nothing is said specifically in reference to the tonsils, though strong argument is offered in favor of the infectious origin of chorea. It was much easier to trace the association of acute rheumatic fever and chorea to an acute tonsillitis than it was later to associate the arthritis, endocarditis, nephritis, cholangitis, appendicitis and other remote lesions to a focus in the head which was apparently latent and giving no symptoms. It was not till the wonderful work of Rosenow[1] was published showing the transmutability of various strains of pathogenic organisms of the streptococcus-pneumococcus group, and also the tissue affinity of certain pathogenic cocci for certain tissues of the body that the subject of focal infection assumed fresh interest. It explained certain difficult problems, as the inconstancy of the type of organisms found in certain conditions as rheumatic fever. Rosenow by his own discovered methods of culture was also able to find in the fluids of inflamed joints and the nodes adja-

cent thereto organisms which had been overlooked by other careful observers. He was also able to produce by intravenous injections of rabbits with culture obtained from infected areas corresponding lesions in a large percentage of cases. The same result was obtained by injecting the organism found in the original focus of infection. By altering the character of the culture medium he was able to develop in the organism affinity for certain tissues. For instance, Rosenow succeeded in cultivating the streptococcus pyogenus on media containing kidney extract, which produced kidney lesions in animals inoculated. Tissues of other organs, as the gall bladder, appendix, etc., were treated in the same way, and there was developed a corresponding lesion in the inoculated animal. It is thought that these organisms acquire certain pathogenic elective tissues affinity in the foci of infection.

According to Billings,[2] "The main and fundamental principles which have been proved are: (1) The apparent confirmation of the transmutability of the members of the streptococcus-pneumococcus group in varieties of morphology, cultural characteristics, biologic reactions, and also of general and specific pathogenicity; (2) The acquisition of pathogenic elective tissue affinity by bacteria in foci of infection in culture media and serial animal passage." To be convinced of this as a scientific fact it is only necessary to read carefully the writings of Rosenow and Billings.

It is natural that the upper respiratory tract should bear the brunt, so to speak, of focal infection when we consider the complicated anatomic structure, with enclosed cavities and pockets all covered by a delicate layer of mucous membrane. In this connection it is interesting to quote from the experience of George B. Wood:[3] "Experimental work has shown that the tubercle bacilli can pass through the unaltered cryptal epithelium, and recently in a series of experiments I found that the anthrax bacilli will also penetrate through the normal cryptal epithelium, and that to the exclusion of other portions of the pharyngeal mucosa. After gaining entrance to the tonsillar parenchyma the action of the toxin of the anthrax bacilli destroys the vitality of the tissues and points the way for a secondary invasion of staphylococci and other organisms."

Then again the nose and throat are constantly exposed to

the danger of infection from the air and food. It is a well known fact that the mouth is normally inhabited by a large flora of saphrophytic and parasitic organisms. It is generally agreed that the tonsils, including the lingual and pharyngeal glands (adenoids), take first place as a focus of infection. with the sinuses of the head, teeth, and ear contributing their quota of systemic disturbance. After the first decade in life the importance of the teeth as foci of infection is greatly increased as the result of their decay, which requires capping, crowning and plugging. "Overdentistried" teeth become great sources of danger as infecting areas, and should at once arouse suspicion when endeavoring to locate the hidden focus.

A variety of microorganisms have been isolated from foci in the nose and throat, chiefly the streptococcus hemolysans, streptococcus viridans, streptococcus mucosus, micrococcus catarrhalis, pneumococcus, staphylococcus, grippe bacillus, diphtheria, and pseudodiphtheria bacillus, tubercle bacillus, and a few other pathogenic microorganisms. The number of local and general diseases caused by the entrance of microorganisms into the general circulation is a large one, and is being gradually increased. Diseases which are due to confined areas of infection form a large and important group. The character and type of a primary syphilitic focus in the nose or throat is so unlike the usual type of confined infections under consideration, and is likewise rare, that it may well be omitted from discussion.

The diseases which may have their origin in foci of infection in the head are acute rheumatic fever, endocarditis, pericarditis, myocarditis, chorea, pleuritis, arteritis, nephritis, gastric and duodenal ulcer, cholecystitis with and without gall stones, pancreatitis, appendicitis, neuritis, myostitis, adenitis, Hodgkin's disease, iritis, acute thyroiditis, goiter, osteomyelitis, spinal myelitis, brain abscess, labyrinthitis, erythema nodosum, herpes, urticaria, and bronchial asthma. The last named, bronchial asthma, is so different in its character and relation to the infected focus that it will be considered entirely apart from the other diseases. It does not seem advisable to divide the diseases considered to arise from foci of infection into acute and chronic, as is sometimes done, for often there is no sharp line dividing one from the other. The acuteness of

the reaction to an invading organism may depend upon: (1) the character and virulence of the organism, (2) their number, (3) the resistance, local and general, of the individual. Rosenow has shown that the local environment of certain organisms in a given focus particularly as to the oxygen tension, may not only alter their type morphologically and culturally, but also change their virulence. They may also develop a certain tissue affinity (tropism) in the focus which markedly affects the location and type of the disease. However, certain types of organism show a predilection for the tissue found in the crypts of the tonsils or adenoids, the sinuses of the head, the teeth and the alveolar processes, or cavities of the ear. For instance, the streptococcus viridans is the organism most frequently found in diseases of the alveolar processes, and is also found in the heart valves, and in the blood of patients suffering from chronic infective endocarditis. The streptococcus hemolysans is the usual organism found in acute septic sore throats, and likewise in the affected joints and endocardium. Tubercle bacilli are found in the crypts of the tonsils and adenoids, from whence they break through the barrier and invade the glands of the neck and mediastinum. When this local resistance is overcome they extend still further and invade other tissues of the body.

Organisms from foci of infection reach the system either through the blood stream or the lymphatics, more frequently by the former. Through the act of swallowing, virulent material from the nose and throat may reach the general circulation from the gastrointestinal tract. After reaching the general circulation they find lodgment in the capillaries and terminal arterioles producing capillary embolism. Adami says it is more like a thrombosis. When bacteria are halted in the blood stream there is produced at the site proliferation of the endothelial lining and an exudation of leucocytes and plasma cells. At times there occurs a hemorrhagic exudate, and there may be a resulting formation of scar tissue. It is now thought that appendicitis, peptic ulcer, and cholecystitis may be produced in this way by a lodgment of the organism from a focus in the small vessels of the submucous layer of the organs. General surgeons have often noted the occurrence of appendicitis following an attack of acute tonsillitis. It would

likewise be easy for a focus in chronically diseased tonsils or elsewhere in the head to cause serious lesions in distant organs without attention being directed to the primary focus. This is really what usually happens. Loeb,[5] in 1910, called attention to a series of cases of acute nephritis due to tonsillar infection. On account of the hematogenous nature of the infection the type of disease in the kidney is usually a glomerulonephritis. In case of severe toxemia due to absorption of soluble toxins, as in scarlet fever and diphtheria, there is produced a diffused nephritis (large white kidney). There may be more than one primary focus in the head, so it is not sufficient in searching for the origin of the systemic disturbance to say that the patient has a focus, as in the tonsils, the teeth area, the sinuses or the ear. Should one focus be removed and others left to continue their discharge of virulent organisms into the circulation, our patients would not receive the benefit from surgical procedure which they had reason to expect.

On account of the great difficulty in giving the tonsils a "clean bill of health," so to speak, however innocent they may appear, the writer is in the habit, particularly in adults, of calling in the services of a competent dentist, who makes use of X-ray films in his work, in order that no focus of infection in the teeth and alveolar processes may be overlooked. The sinuses of the head and ear with the mastoid region should be examined with great care, calling into use the roentgenologist when necessary. By proceeding in this way we may spare our patient a needless operation. Richardson[6] has emphasized the importance of caution in diagnosis before resorting to needless tonsillectomy. French[7] has been using a method of transillumination of the tonsils for the diagnosis of inflammatory conditions. We shall await his final report with interest. The hypodermic needle has been used in the search of a hidden foci in the tonsil. Shambaugh[8] rightly says: "As regards the appearance of the faucial tonsil which is a focus for systemic infection, it is quite clear that the size of the tonsil is no index of the menace this structure may be to the individual." It is true that the small tonsil frequently contains a dangerous focus for systemic infection; on the contrary, the writer is inclined to be more suspicious of the large tonsil in the adult. In children there is frequently seen a type of

tonsil which projects prominently into the throat, and which is only slightly covered by the pillars. This type, while apparently large, is less likely to give systemic trouble on account of better drainage of the crypts. There is another type of tonsil which always arouses our suspicion. It is the type particularly in children which is apparently small, so well is it buried behind the pillars of the fauces. On removal, however, its size is found to be surprisingly large. It is covered by the pillars, and the mucous membrane of the palate interfering with the drainage of the crypts, especially those of the upper lobe, places the owner in constant danger of systemic infection. Coolidge and Garland[9] have weighed tonsils removed, and their results were surprising in showing only slight variation in size. The irregularly shaped tonsil with fissures projecting beneath the surface of the gland should always excite our suspicion. When the mouths of the crypts show exudation of purulent material we have positive evidence of the infected tonsil. Firm pressure on the tonsil made through the anterior pillar will often reveal a cheesy purulent exudate. In chronic tonsillitis there is often noted a peculiar livid redness of the pillars not noted in the relatively healthy gland. The tonsillar gland near the angle of the inferior maxilla is likely to be quite palpable in case of chronic tonsillitis, though this is not invariably the case. It is remarkable how many people go about harboring these infected foci in the tonsil with no local or systemic symptoms. However, when one's resistance is lowered by overwork, undernourishment, bad hygienic surroundings, exposure to heat or cold, overindulgence in alcohol, or excesses of any kind, the confined focus may become active and there may ensue symptoms of both local and constitutional disease. We have a parallel to this condition in tuberculosis of children which may remain latent for years in the glandular system, till later in life, when something lowers the resistance and active tuberculosis has its beginning.

In searching for foci of infection in the sinuses every means should be employed to reach a correct diagnosis of their condition. While X-ray findings are considered of more value than transillumination, yet the latter is often of distinct value, especially in the maxillary sinus, and is particularly useful on account of its simplicity. Irrigation of the suspected sinus

is the best proof of the presence or absence of pus. The X-ray is absolutely essential for the examination of the teeth and the alveolar processes, and is helpful in cases of suspected mastoiditis.

The pharyngeal tonsil (adenoids) on account of better drainage of its crypts is less likely to contain a focus of infection than the faucial tonsil. Yet tuberculosis of this gland occurs with a considerable degree of frequency. Many times inflammation in the nasopharynx is evidenced by enlargement of the posterior cervical group of glands. Goodale[10] has emphasized for us the importance of infections arising from the lymphatic glands on the posterior wall of the pharynx. The secondary foci of infection arising from the nose and throat may be more virulent than the original source of infection. The appendix or gall bladder may form secondary foci supplying pathogenic bacteria to other organs of the body. The establishment of these secondary foci explains why infectious arthritis continues to spread from one joint to another or to the endocardium, long after the primary focus has been removed. This fact should make us a bit guarded in our prognosis of these difficult cases, but yet our duty in removing the primary focus is none the less urgent. In our efforts to make a diagnosis of a focal infection we should take a careful history of the case. This is just as important as the physical findings, especially is this true in reference to the faucial tonsils. The patient will often give a history of frequent attacks of tonsillitis, especially in early childhood. He may have had scarlet fever, or diphtheria, which was followed by a "weak throat." There may be a history of incomplete tonsil operation where a portion of the gland was left with the mouths of the crypts sealed by scar tissue. A former cervical adenitis or ear trouble is very important. Inquiry should be made as to the occurrence of rheumatism. In young children this may be evidenced by what is known as "growing pains." The patient should be questioned in regard to the teeth, particularly in reference to plugging, crowning and nerve killing. In regard to the nose, the patient should be asked as to the occurrence of socalled "nasal catarrh," freedom of nasal breathing, headache, and a history of influenza attack. Many cases of chronic

sinuitis have their origin in an old untreated grippal infection of the sinuses.

As preventive treatment is now the order of the day, it would seem that we as specialists should do our part in educating the public through our patients to take those precautions which will in a measure safeguard them from the kind of infection under consideration.

Chronic focal infections which work such havoc on the human organism often have their origin in an acute infection of the nose or throat during childhood. We should teach that all acute colds are contagious, and so far as practicable patients suffering from the disease should be isolated. This is all the more important in children on account of their greater susceptibility, and because of the greater seriousness of both immediate and remote results. Hastings[11] has emphasized the harmfulness of swimming pools and sea bathing during attacks of acute rhinitis. There is danger of driving the infection into the sinuses of the head and to the middle ear. In case of the public swimming pools there is likewise danger from a public health standpoint. Patients with acute colds should be taught to cough and to sneeze into gauze to be subsequently burned, just as our tuberculosis patients are required to do. The latter is far less contagious than the former. The patient should be cautioned in blowing the nose, to obstruct only one side at a time, in order to protect the middle ear. There is also a danger in nasal douches in the hands of our patients, and their use is seldom justified. Complications of an acute cold are much less likely to ensue if a patient from the beginning is put to bed and the usual local and constitutional treatment instituted. Many cases of acute rhinitis are complicated with sinuitis, and Davis[12] has shown how frequently acute ethmoiditis occurring in children is overlooked. Again, ethmoiditis at this time may be the starting point of a chronic process in later life. There is another danger in the increasing popularity of sleeping porches for young children in all kinds of wintry weather. If used in cold weather at all, there should be ample protection from the wind. In certain cases of acute rhinitis, laryngitis, and bronchitis, cold is surely harmful. Morse[13] has emphasized this in cases of bronchitis and laryngitis complicating pneumonia. Mothers should

be taught that earache is not to be regarded lightly and requires more than the instillation of sweet oil or laudanum. They should likewise be impressed with the fact that a running ear is a positive danger, and requires the most skillful care a specialist can give. Many chronic foci in the ear and mastoid have their origin in the neglected ears of childhood. It is a common observation that the number of ears requiring mastoid operations has been greatly reduced since tonsillectomy and adenoidectomy have become more general, and likewise more thorough. The public should be instructed in reference to the importance of oral hygiene, and the dentists can contribute their share in this direction. Thorough cleansing of the teeth with a good brush is absolutely essential to keep the gums and teeth in a healthy condition and to prevent deposits from forming around the gum margins. To this end a regular visit to the dentist is necessary, and attention should be given to early decay of the teeth before extensive necrosis has taken place. Contrary to the general opinion, the first teeth should receive the same care as the permanent teeth. On account of the close relationship between the roots of certain teeth and the antrum, their care assumes a twofold importance. As already referred to, there is a close relationship between infected gums and alveolar processes and tonsillitis.

The treatment of focal infection in the nose and throat depends upon whether the case be acute or chronic. Obviously the treatment of an attack of acute tonsillitis with arthritis will differ from that of a case of chronic tonsillitis with joint involvement. There are two well established methods of relieving an individual of an infected focus, one by entire removal, and the other by drainage. In chronic tonsillitis we resort to the former, and in sinuitis we practice drainage. In acute tonsillitis, with or without secondary foci of infection, it is not advisable to remove the tonsils. Billings says the course of acute rheumatic fever is not materially affected thereby. Without going into the details of the medical care of acute tonsillitis the writer would urge the use of salicylic acid in sufficient dosage, as it seems to have a specific effect on the streptococcus rheumaticus or its toxin. Barnes[14] advises swabbing the tonsils with 50 per cent nitrate of silver, if seen early in the course of the disease. A peritonsillar ab-

scess should be incised as soon as pus formation has taken place, which is usually about the third day, as fatal septicemia may result from too long delay of this surgical procedure. Without going into the details of the management of acute sinuitis, suffice to say its care should not be neglected. An early convalescence depends upon adequate ventilation and drainage. Shrinking the mucous membrane of the nose with such agents as a weak solution of cocaine or menthol solution is desirable. The Coffin[15] suction apparatus is often used to facilitate drainage from the infected sinus. Irrigation of an infected antrum, preferably through the natural opening, is essential for the successful treatment of maxillary sinuitis. The importance of early incision of the drum membrane in acute otitis media has been so generally recognized that it seems unnecessary to emphasize it at this time.

Chronic foci of infection in the nose and throat as a rule demand surgical treatment. The tonsils being the most important will be considered first. Nothing will be said as to the technic of their removal except that the operation must be thorough, with a minimum of trauma to the surrounding tissues. So serious for the patient is the systemic disturbance arising from foci of infection in the tonsil that we are rarely justified in the use of halfway measures, as incision of the crypts or the use of the cautery or curette. In case of very slow coagulation time of the blood, or extreme old age, we may be justified in doing less than a complete tonsillectomy.

Albuminuria with casts, instead of being a contraindication, may be a positive indication for tonsil removal. This condition of the urine in two recent cases of children operated on by the writer cleared up promptly after tonsillectomy, and the ether itself had no harmful effect, as shown by urinary findings following the operation. Billings[16] says in this connection: "Infectious acute nephritis due to specific elective tissue affinity of certain bacteria, especially members of the streptococcus group, demands an early removal of the focal cause. By this means death may be prevented, and if the anatomic injury to the kidney is not too great the function may be preserved to a degree consistent with health for many years." In adults, however, with kidney complications local anesthesia should be used.

Valvular heart disease (if compensation is not broken) is no contraindication for tonsillectomy. In older children and adults local anesthesia should be used. Though the operation cannot repair the injured valve, it might spare the patient a fresh invasion of bacteria, with serious consequences to the valvular lesion.

In chorea personal experience with tonsillectomy and adenoidectomy has been so satisfactory that the author is inclined to urge operation in these cases in the absence of other foci of infection. Three recent cases cleared up promptly and suffered no serious disturbance incident to the operation. The fact that they had no complications with secondary foci in the joints or elsewhere may explain the favorable results following the operation. Crowe,[17] on the other hand, with a large experience, advises against operation in chorea.

Without attempting to give the dental treatment for infection of the teeth and alveolar processes, the dentist's attitude is not infrequently too conservative, showing a tendency to treat these infected foci where an extraction of the affected tooth would better safeguard the patient's health.

Bronchial asthma, as distinguished from the socalled cardiac and renal asthma, is now regarded in the light of an anaphylaxis. This phenomenon was first noted by Theobald Smith, and later by Rosenow and Anderson.[18] Auer and Lewis[19] and Meltzer[20] also showed the similarity of anaphylactic paroxysm to bronchial asthma. They explained that it was due to a spasm of the bronchioles and not caused by a nervous reflex, as was so long held by many clinicians. They were able to demonstrate the symptoms of spasmodic asthma in guinea pigs after severing all nervous connection with the spinal cord. Babcock[21] was one of the first clinicians to emphasize the connection between bronchial asthma and foci of infection in the nose. Since that time Mathews,[22] Lewis and others have added their clinical observations. In the discussion of this subject in the light of foci of infection, consideration will not be given to certain types of asthma which are intimately associated with the ingestion of certain foods, and with asthma and hay fever due to pollens and emanations from the horse.

We must regard spasmodic asthma in an entirely different light from other systemic diseases which have their origin in

foci of infection in the nose and the throat. In the diseases previously considered there was a bacteremia with emboli in capillary vessels of various organs of the body. In asthma, however, we have the absorption of a protein substance to which the cells of the body have been sensitized; it may be a proteid of bacterial origin, or in some cases the products mucus or pus found in the sinuses. Mathews[22] from his experiments reached the conclusion that "mucus or pus, either infected or sterile, is capable of acting as an antigen and that the products of bacteria are not essential in producing either sensitization or shock." Whether these findings can be wholly accepted or not, the fact remains that the relief of our patients depends upon ridding him of these areas supplying the system with sensitizing proteids. The frequent association of nasal polypi with asthma has long been noted, but it was thought that the former was only a symptom or local manifestation of the constitutional disease.

Lately we have regarded nasal polypi as a symptom of chronic sinuitis often due to hyperplasia of the ethmoid cells and not necessarily a purulent ethmoiditis (Beck[23]). The treatment of this type of asthma must be based on an accurate diagnosis obtained from a careful history of the case, followed by a thorough examination. Carefully made X-ray plates are of great service in determining the condition of the sinuses. That most brilliant results may be obtained in the treatment of these cases where one sinus alone is involved has been demonstrated by two recent cases. The antrum cases seem to respond particularly well to treatment. The structure of the ethmoid offers difficulties which may require time and patience in eradicating the focus. The secret of success in all cases is thoroughness of drainage.

In January of the present year (1917) the writer operated upon a man of middle life who had come from New England to Asheville seeking climatic relief for his asthma. After spending several months in the mountains without benefit, he decided to have an operation performed upon his nose. His was an unusual condition in that he had a single pendulous polyp attached in the region of the bulla ethmoidalis on the left side. This was removed and the cells adjacent to the point of attachment were curetted. As was to be expected,

he had asthma in rather severe form for several days following the operation, but since that time to the present day, more than three months, he has not had a sign of asthma, in spite of several attacks of "cold." Frequently we encounter cases where the result of operations are not so satisfactory, but failure or partial success in these cases may be attributed to our inability to eradicate the foci of infection in the nose or the presence of foci elsewhere in the body. Unfortunately, there is often a complicating bronchitis, or a bronchiectasis, which is a source of the sensitizing proteid. It may be in just such cases that Freudenthal[24] and Horn[25] have had success through the establishment of better drainage by the passage of the bronchoscope. Although the foci of infection in asthma are most frequently in the sinuses, yet we must not disregard other foci in the head and elsewhere in the body. Babcock[26] reports a case which kept well so long as the gall bladder was draining, but in which there was a return of the spasmodic symptoms with a stoppage of discharge from the infected gall bladder.

A consideration of this subject would not be complete without a brief reference to the use of socalled vaccines in the treatment of foci of infection in the head, for even the enthusiastic advocates of this therapy do not pretend that it will supplant surgical treatment in these chronic infected areas. It was held for a long time by careful workers in this field of medicine that the action of vaccines on various infectious processes was specific, and that the only ones worthy of consideration were the autogenous vaccines. It was found very difficult at times to isolate the particular organism which was the cause of the inflamamtory condition; especially was this the case in open foci in the nose and throat. Then again, as previously referred to, recent workers have shown how certain pathogenic organisms, particularly of the streptococcus group, vary as to their strain under different environments which markedly alter their pathogenicity and likewise their selective tissue affinity. These recent discoveries have necessarily modified our views as to the efficacy of autogenous and stock vaccines. However, we cannot ignore the clinical experience of such careful workers as Coates[27] and others, particularly in chronic suppurative ears. There seems to be

ground for hope that in the future there will be developed a nonspecific protein substance which on injection will contain offensive and defensive substances against the invading organism and its toxin, without giving in to the violent reaction, the chill, high temperature, and marked leucocytosis following their use. It is hoped that these careful laboratory workers will continue their efforts along this line till an efficient antigen is found which will be without danger to the patient.

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XI.

REMOVAL OF FOREIGN BODIES FROM THE LARYNX, DISPROVING PREVIOUSLY MADE DIAGNOSIS.*

By Hill Hastings, M. D.,

Los Angeles.

The rapidly growing use of direct laryngoscopy is showing up many incorrect diagnoses, especially in children, where foreign bodies were found in the larynx and trachea. The increasing number of them makes one feel that it is worth while to report all such cases. The accumulation of reports of this kind is unquestionably arousing the general medical profession's attention to the possibility of foreign body impaction in babies who are supposed to have "croup," "thymic asthma," and other obstructive conditions.

A fear that is met with in handling babies with obstructed breathing is the feeling that fatal asphyxia will occur during direct laryngoscopy, or subsequently after removal of the foreign body, from edema of the glottis. A preliminary tracheotomy is therefore often urged by the family physician, and many of us who are aware of our own lack of skill will often be rather willingly persuaded to do a tracheotomy before attempting the removal of foreign bodies in babies.

I would like to present a report of two cases (both babies), with incorrect diagnoses, in which foreign bodies were found impacted in the larynx.

Baby L., aged seventeen months, had been sick for a week with "croup," with gradually increasing obstruction to breathing. The father, a physician, and a brother practitioner had been treating the patient with the feeling that the trouble was "croup" with slight bronchitis. No diphtheritic membrane had been seen in the throat, and cultures from the secretion

*Read before the American Laryngological Association, Atlantic City, N. Y., May, 1917.

had been negative for diphtheria. There had been slight respiratory obstruction and a little fever—100.6 the highest. The baby was asleep in bed at the time of our consultation and was breathing with audible roughness, but without cyanosis and without any considerable difficulty. The possibility of foreign body impaction was suggested, whereupon the father said that he dated the trouble to a little choking spell which the child had had when fed some soft boiled egg; but that the child had not really suffered much until two or three days later, when the increasing croupy cough and cry, and a little fever had made him disregard the choking event. On waking the child its crying increased the dyspnea and brought on some cyanosis, which subsided quickly when the child again became quiet. Indirect laryngoscopy was a failure. The father preferred to await the result of X-ray examinations and the use of simple therapeutical measures before allowing direct laryngoscopical examination. The X-ray examination was negative. The child's obstruction grew gradually worse, and direct laryngoscopic examination was agreed to. After a consideration of the danger of operating without a preliminary tracheotomy it was finally decided to do a tracheotomy.

With the use of Jackson's small size laryngeal speculum a piece of egg shell was found embedded in the larynx, between the cords, protruding into the glottis, giving very much the same picture as is shown in the drawing in Dr. Jackson's book of a similar case. There was considerable edema of both vocal cords and bands, and some purulent secretion. The egg shell was easily removed. Convalescence was uneventful. The tracheotomy tube was not removed for three or four days because of the difficulty in breathing that resulted on attempts to do without it—which supported the contention that a preliminary tracheotomy was advisable.

The history of the second case was rather indefinite. Baby W., sixteen months old, was hurriedly brought from the country to the California hospital because of great dyspnea. The child was already on the operating table when I first saw it. Tracheotomy instruments had been prepared. The dyspnea was severe. There was enormous distention of the anterior chest wall, marked during efforts of inspiration, but also pronounced during both inspiration and expiration. This chest

wall distention was so great that a large growth of the mediastinum had been suspected. Both lungs were distended. There was a generalized bronchitis, and a temperature of 104°. There was alarming cyanosis and the patient was almost unconscious. The only history obtained was that the illness dated back fifteen days to a choking spell that occurred while the child was sucking a piece of mutton chop bone. The parents were poor and ignorant and lived in the country away from medical aid and did not realize for several days the gravity of the trouble. One of their local physicians, called in after the child had become very sick, had suspected a growth in the chest, or a mediastinal abscess. No X-ray examination had been made.

Foreign body impaction was at once suspected. Immediate tracheotomy was done without any anesthetic. The patient was practically unconscious from the deep cyanosis. On opening the trachea immediate relief was obtained and the acute pigeon breast, tumor-like appearance at once disappeared. The end of a piece of bone was felt at the tracheal opening. The bone, rather firmly impacted above in the larynx, was removed by forceps. It was a large rather thick sliver, about one inch long, sharp at its upper end. The child's fever and considerable purulent discharge and cough continued for a few days. Recovery was complete and the patient was discharged on the sixteenth day.

XII.

RHINOSCOPY.*

By E. M. Holmes, M. D.,

Boston.

Within the memory of many of us the examination of the nasal chambers consisted simply in the spreading of the alæ with some dilating forceps or tube, and the inspection of the anterior ends of the lower and middle turbinates, the anterior portion of the septum and any new growths or foreign bodies which were of sufficient size and favorably situated to come within direct vision through the anterior nasal opening.

The posterior ends of the turbinates and the septum were more or less satisfactorily viewed by the aid of the postnasal mirror, and in the general clinic the results were more frequently less satisfactory than otherwise.

In cases of marked atrophy or of the loss of the turbinate bodies, surgically or otherwise, the direct inspection through the anterior nares was much easier, and the deeper recesses were more satisfactorily examined.

About fifteen years ago the process of roentgenography became sufficiently developed to obtain fairly good shadowgraphs of the bony framework of the nasal fossæ and their associated cavities.

Although accessory sinus disease had been studied and more or less successfully treated before this discovery, the radiograph, aiding in differentiation of area and degree, was a factor in stimulating research, and it began to be more generally recognized that many of the diseased conditions of the nose, both acute and chronic, were due to infection and pathologic changes within one or more of the cells associated with this organ. It was also more generally recognized that many of the nasal conditions showing diseases of the other structures were secondary to some infection of the sinuses.

*Presented with lantern illustrations, by invitation, at a meeting of the Section of Otology and Laryngology of the College of Physicians, Philadelphia, November 15, 1916.

Radical surgery of the turbinates and the ethmoid structures became commonplace, but it was found that these extensive exenterations very frequently left the patient in a condition, though relieved in some ways, permanently incapacitated in others. Were it not for this fact nasal surgery would become extremely simple, for it would make little difference how little or how extensive the diseased condition, the whole labyrinth could be removed and the diseased area be eradicated. Unfortunately, the results following extensive removal of intranasal structure frequently are distressing and grave, and at present the general trend is to conserve all of this structure possible. This makes it extremely important to use every means within our power to inspect the nasal cavities as thoroughly as possible and therefore use all methods known to bring within our vision the various recesses of these cavities.

We all recognize the importance of examining the anterior nares, first without dilatation, and then by some dilating speculum. The radiograph, though frequently misleading, is of service, and at times it gives us very important information. Transillumination like the radiograph may be of service when there is marked increase in density with diminution of transparency due to thick secretion or abnormal growth.

Though it may not be absolutely true that "seeing is believing and sight is infallible," clear vision presents a picture to the observer which is more definite, more correct and more convincing than can be obtained by any other means. There are many areas within the nasal cavities not open to direct unaided vision. They are dark and not in a direct unobstructed line from any point in which it is possible to place the observer's eye. As the structures obstructing the light rays to and from many of these dark recesses of the nose, cannot well be removed, it is necessary to bring to our aid some instrument which enables us to refract the rays so that we can loop around these obstructions. Very trustworthy and most valuable information is given by a lens adjusted periscope, and the most efficient periscope is one which carries at its tip the means of lighting the field of its view. Any combination of lenses in a periscope has necessarily one focal distance. At this distance objects appear at approximately the size they would present if viewed in a straight line at the normal distance for

the eye. At other than the normal focal distance from the fenestra of the endoscope there is a change in the apparent size of the object. If nearer, the object is magnified; if farther away, it appears smaller. The field in the usual endoscopic prismatic lens is always advanced at right angles to the surface of the exposed prism, and as the prism is usually set the field is always at right angles to the length of the tube. These facts are of the greatest importance, and only so far as we keep them in mind and learn to correct the findings are we able to acquire definite and correct knowledge concerning the area which we are studying.

It is as important to acquire a good working technic to use the endoscope as it is to successfully use the microscope. Failing to appreciate this, many rhinologists have tried some instrument a few times and have then discarded it, or have continued its use in a more or less bungling and unsatisfactory manner. All who have become proficient in endoscopic technic and have learned to correctly interpret the findings, I believe will agree that it is one of our best means for observing and diagnosing pathologic conditions in the otherwise hidden recesses of the nose and for guiding the instruments used in treating or removing these abnormalities.

The thing necessary is to study and acquire a thorough working knowledge of the topography, as viewed by the endoscope. It matters little how well we know our nasal anatomy, when we use an instrument which, in practice, carries our visual center to within the nasal cavity, and enables us to view a circumscribed area of the structure from a viewpoint absolutely new, we are naturally like a tramper in a dense forest, viewing some cliff or stream, knowing nothing of its relation to the surrounding world. If the explorer works his way carefully into the new and unknown region, marking and guiding his journeys, he will in time become acquainted with all his surroundings, and finally he can directly find any desired section and can tell whether he finds it in its normal state. This is true in regard to endoscopic study of the nasal chambers, and it is absolutely necessary for the beginner to establish certain and, as far as possible, fixed paths of exploration, never losing compass bearings and always remembering his relations. Until he knows the appearance of every available

field and the path of approach to all these fields in the normal, he has no reason to become discouraged or to discredit the means of search, if he is unable to find and understand the pathologic conditions he may be called upon to diagnose and eradicate.

In practically all walks of life there are several paths, several methods of accomplishing the same results. We find this true in surgery as in other medical branches, and in presenting my technic in rhinoscopy I do not wish to be understood as thinking this the only way or the best method. It is the one I have accustomed myself to use, and now that I have learned it, it is undoubtedly the best for me to follow. What I do wish is that every man, who tries to practice rhinoscopy, would select some fixed and sure method of exploring as much of the whole nasal cavity as possible, never losing the relation of the parts under his immediate vision.

After having acquired proficiency in exploration, we are then ready to begin the handling of instruments under guidance of our right angle vision.

To the laryngologist the ability to carry out this work is quickly acquired, as the manipulations are practically directed as they are by the aid of the laryngeal mirror. Owing to abnormalities of structure the laryngeal mirror cannot always be held in the same manner, neither can the endoscope always be used in the same unchanging manner, and the course I am about to describe cannot always be adhered to, but when it can I believe it, in the abstract, as perfect as we have been able to find.

To go into detail concerning anatomic and pathologic appearances, as seen endoscopically, would take more time than we have at our disposal. The scope of this paper must therefore be limited to only the superficial survey of this work.

In the first place, if there is much secretion in the lower fossa, it should be carefully removed by cotton tipped applicators. Do not use douche or spray, or have the patient blow or clear the nose if it can be prevented. Whenever the mucous membrane is very sensitive or the patient is nervous and apprehensive, it is best to first carefully cocainize the lower fossa. When the lower fossa is fairly clear pass the endoscope along the floor with the fenestra pointing upwards and

inspect the septum, the inner wall of the lower turbinate, the middle turbinate and the cribriform fossa from front backward until the epipharynx comes into view. After entering the epipharynx, by rotating the instrument to the outer side, the posterior ends of the turbinates are easily examined. By rotating the scope toward the center the posterior edge of the septum is presented for examination. The scope should now be rotated until the window looks upward, when it should be slowly removed. This procedure brings the front wall of the sphenoid, between the middle turbinate and septum, into view, and at the upper limit of this the sphenoid opening is often seen. If it is not, we change our viewpoint by changing the direction of our tube. The proximal eyepiece is carried upward, keeping the tip on the nasal floor. In this position the field is widened by rotating the barrel of the scope. In cases where the middle turbinates are large or where there are polypi or other growth, it is sometimes necessary to carry the tip of the scope by the turbinates and to approach the superior fossa. This freqeuntly will bring the ostium into view. But whenever we change our viewpoint we must always remember that as we approach a field our object appears larger, and when we recede from a fixed and accustomed point the reverse is true. We have not advanced long in this work before these findings are rectified quite subconsciously, and approximately correctly. This must at first be made a mental process, and it is a very important part of our early study.

If, with the tip of our scope in the middle fossa, we direct the fenestra outward, the outer portion of this fossa is brought into view. By withdrawing the scope slightly the ostium of the maxillary antrum is frequently brought within vision. It is often quite a task to find this opening, and considerable jockeying of the tip of the instrument may be necessary. In about forty per cent of all noses examined it is possible to see the ostium of the antrum, and where this is impossible we can examine the mucous membrane which is near the opening, and if this is bathed in secretion or is more inflamed than the adjacent schniderian membranes, we are given more or less valuable knowledge.

Whenever we find pus in any portion of the nose we should try, and, in the major portion of the cases we can, follow it to

its source, either to the sphenoid, the antral ostia, or to the ethmoid or frontal region. In this connection it is important to bear in mind that secretion, whether purulent or otherwise, can be carried by blowing the nose, by douching, or by using a spray. It is also necessary, in cases of profuse discharge, to carefully remove this discharge by cotton applicators before we can form any opinion of the source. With these precautions, when pus is found discharging from a particular sinus, we can be more sure that that sinus, at least, has a purulent infection, than we can by any other sign. Small growths, hidden within the fossa from direct vision, are almost always seen by the scope, and they can frequently be removed under direction of this refracted vision. Wherever situated, it is of the greatest importance to discover malignant disease early. The sponge-like anatomic construction of the nasal and adjacent structures makes it imperative that the disease be early recognized and immediately eradicated if a cure is expected. During the past month a physician consulted me for moderate nasal hemorrhage, which he had experienced several times during the preceding two months. Examination of the septum, the usual site of hemorrhage, showed nothing. There were no signs of disease until the scope was directed into the middle fossa under the left middle turbinate. Here was found a tumor the size of a pea, vascular in appearance and of a granular type. This was removed and found by the pathologist to be carcinoma of a slow growing type. The middle turbinate and ethmoid wall were removed, and apparently the growth was successfully circumscribed. The radiograph showed nothing in this case, as we would expect, and had it not been for the endoscope the condition would not likely have been found until the growth had become of such size as to show below the turbinate. Before such time it would likely have advanced and filled the ethmoid to such a degree as to have been nonoperative. I have seen several cases like the above, and believe when we more carefully examine endoscopically every nose which comes to us, we shall discern these (the most serious conditions the rhinologist is called upon to treat) sufficiently early to thoroughly eradicate a considerable number, and unless recognized and attacked early this condition is hopeless.

Endoscopy is of invaluable aid in our study of the sphenoid region. We can see the opening from the cavity in seventy per cent of all cases examined. If there is secretion discharging from this cavity it can usually be definitely demonstrated. The sphenoid cavity can be syringed under the direction of vision and its capacity accurately measured.

In measuring this cavity the long small eustachian canula is first carried into the cavity through the natural ostium. While the patient's head is held far forward, air is gently forced through the canula. This process removes any secretion within the cavity. The patient's head is now carried backward so that the sphenoid ostium is approximately at the highest relative point. A colored normal salt solution is now carefully forced through the canula from a graduated syringe until it is seen to begin to overflow from the sphenoid opening. The cavity is now full, and the amount of fluid shown to have been used from the syringe is the fluid capacity of the sphenoid cavity. This is an important factor in conditions requiring interference, as frequently the septum, between the sphenoid cavities, is so placed that the roentgenograph gives us little knowledge concerning the two sides.

We cannot go into detail concerning the instrumentation carried out under rhinoscopy, yet it seems advisable to speak of certain points.

First, in most of the endonasal work, the endoscope and the operative instrument have to be used in the same side of the nose. We must remember that blood upon the window of our instrument or between this and the operative field will blur or entirely obscure our vision, and the patient's head must therefore be placed so far as possible in a position that all blood will gravitate away from the tip of the scope. If hemorrhage is not too profuse this can usually be accomplished. It is easier in most cases to have the endoscope placed well down in the lower fossa and near the septum, and the other instrument to the outside and above. In working high up within the middle fossa it is often necessary to carry the operative instrument to the septal side of the scope. In doing this the desired field should be obtained and the eyepiece carried as far to the outside as possible. This allows all the space for as direct attack as it is possible to obtain. When operating

upon the posterior ends of the turbinate or upon the adjacent areas it is usually better to carry the scope through the opposite side, and the operative instrument through the side of the nose to be attacked. Whenever it becomes necessary to remove any of the posterior portion of the turbinate the snare or cautery can be guided throughout the whole procedure by vision obtained through a scope passed through the opposite side of the nose. It is possible to remove the desired amount, and only the desired amount, of tissue by the snare, as we not only adjust the wire loop correctly but we constantly observe its progress through the turbinate while it is drawn into the canula.

The endoscope cannot always be used in endonasal operations, and it is not always better to use this instrument and method of procedure. Much of the nasal surgery is carried out under direct unaided vision, and where this can be accomplished no complicated methods can be better or as good. The important work of this instrument is performed within the areas absolutely inaccessible to direct vision without the destruction of normal important structures, and it seems reasonable to predict that before long some form of endoscopic instrument will be universally employed in all endonasal examinations and in all nasal surgery not possible under direct vision.

XIII.

WHAT IS THE CAUSE OF DEFECTIVE ORIENTATION OR EQUILIBRATION?

By L. R. Culbertson, M. D.,

Zanesville, Ohio.

The great demand for aviators and the large number of men being examined for service has led the writer to consider that it is an excellent opportunity for ophthalmologists and otologists to study deeply into the cause of defective orientation or equilibration.

Several months ago I wrote Dr. C. R. Holmes of Cincinnati, who was appointed to an aviation examining board, if he had the time, to investigate if there was any relation between defective eye muscle balance and defective equilibration from labyrinthine defects.

Over twenty years ago Dr. George T. Stevens, of New York, the pioneer and master of eye muscle defects, began a study of skulls in museums and colleges, and his researches showed that the bony orbits of some skulls were plumb with the horizon and some slanted, and some pitched too high or too low and declined at the same time. From this he drew the conclusion that this would make the eyes incline or pitch correspondingly. He used Helmholtz's haploscopic experiment and invented his clinoscope, which demonstrated that many people had more or less declination of the vertical meridians because the bony orbits were not plumb. He then devised his advancement operation of one or all four of the recti msucles of one or both eyes to successfully overcome this defect. Many people having declinations are subject to dizziness, afraid to go in crowds or high places, etc.

The connections of the eye muscle nuclei and labyrinthine nuclei in the brain are intimate, as we all know.

With the knowledge we have of the orbits being liable to stigmata of degeneration—i. e., inclinations or declinations—

down into the larynx, so that the upper end of the tube is under the finger holding up the epiglottis. The finger then holds the tube in position while the obturator is being removed.

If there is difficulty experienced in attempting to introduce the tube marked for the age of the patient, it is usually due to some edema or swelling in the cricoid ring, which is the narrowest point, or to a transient spasm of the glottis. In such cases a smaller tube may be introduced with slight force. Often our best judgment is put to a test as to when the tube should be removed. I am convinced that it should not be removed sooner than five days, in the majority of cases. If done in less time, before the pseudomembrane has disappeared, reintubation will most likely become necessary. The tube should remain longer if the pseudomembrane persists, and it may become necessary to reintubate a number of times if there are ulcerations about the cricoid cartilages, edema, granulations, abductor paralysis or cicatricial contractions.

The early administration of antitoxin has largely reduced the mortality in laryngeal diphtheria. I believe all cases of membranous laryngitis should be treated at first as diphtheritic and that antitoxin be given as soon as the stenosis is suspected or recognized, and the microscopic and cultural examinations be made afterward. If repeated findings are negative as regards Klebs-Loeffler bacilli, the antitoxin need not be continued; but, if still in doubt, it is best to continue it. If the intubating tube is carefully and gently introduced and the string removed, the presence of the tube is not going to disturb or annoy patients very much, and they are much more comfortable while the antitoxin and other medication are being administered.

The majority of cases intubated can be fed liquid food when in an upright position; but it is most always followed by some cough and, frequently, by complaint of some pain. If feeding in the upright position cannot be done, the Casselberry or Hillis position may be resorted to.

XIV.

SOME SUGGESTIONS ON THE IMPORTANCE OF EARLY INTUBATION AND THE USE OF ANTITOXINS IN MEMBRANOUS LARYNGITIS.

By A. C. Wolfe, M. D.,

Columbus.

In my experience of intubating over one hundred cases of membranous laryngitis, I have observed that most physicians postpone intubation longer than they should. I have always advocated early intubation in all cases of membranous laryngitis, be it diphtheritic or otherwise, because, in a great majority of cases, it will become necessary later, when valuable time has been lost and the patient has lost vitality and is more exhausted.

The chances of recovery are much greater if the operation be performed early than if it be reserved as a last resource, and the younger the child the greater the risk in waiting. If the operation be delayed too long, the engorgement of the lungs, which always accompanies sudden stenosis of the larynx or trachea, leads to bronchitis and catarrhal pneumonia, and is thereby liable to bring about a fatal result. If left until all other treatments have failed and systemic infection is marked, a sudden and even a complete oxygenation of the blood will not restore the normal condition, and the patient will succumb to the intense toxemia.

My experience has convinced me that the accident of placing the tube in the esophagus, which often happens to those who are not familiar with the operation, is due to the fact that the handle of the introducer is not lifted high enough so the distal end of the tube points toward the mouth of the larynx instead of the esophagus. The distal end of the tube should come against the left forefinger holding up the epiglottis, which also aids in directing the tube. The tube should not be forced into the larynx, but should drop into it of its own weight, well

it would lead us to the supposition that the labyrinth (internal ear) might have the same defect (i. e., not being plumb with the vertical or horizontal plane of the body or the horizon). If it were not plumb, I believe that the person would be subject to faulty equilibration. How would we know this? The only way to tell would be to remove the entire temporal bone from the head of the dead subject whom we knew to have been through the Bárány tests and known to have faulty equilibration from either eye muscle or ear defects or both; take the bone, get the plumb of the upper ridge of the petrous portion and the zygomatic root, then cut the bone open and see if the semicircular canals were plumb with spirit level. This would have to be done by an expert anatomist.

To determine whether defective equilibration were due to tilting (declination) of one or both labyrinths, both would have to be examined pathologically to determine whether there were any pathologic defect due to syphilis, measles, scarlet fever, etc., or blood vessel defects.

Another thing that would have to be determined would be whether one leg was slightly longer than the other and the amount, and take that amount and figure how many degrees of a circle that would cause in inclination of the body sidewise. Then ascertain if the labyrinths have inclinations to a similar degree; or whether the labyrinths are plumb with the earth's vertical plane, even if one leg is shorter than the other.

I advance these theories in the hope that some able scientific investigators may be able to elucidate this problem.

XV.

NASAL AND NASOPHARYNGEAL FIBROMA, WITH A REFERENCE TO MULTIPLICITY OF GROWTHS.*

By George Morrison Coates, A. B., M. D.,

It was not the intention of the writer, in undertaking this thesis, to review the whole subject of fibromata of the upper air passages, since most exhaustive treatises have appeared, many of them in the Transactions of this Society, during recent years. Such treatises have given extensive bibliographies and discussions on the etiology of these peculiar neoplasms, the different modes of combating them and on their well known tendency to recur, and, now, equally well known tendency to disappear at a certain period in the development of the afflicted individual. In the review of a recent case of my own, incorporated herein, the writer was forced to the conclusion that he was dealing with a definite multiple growth, evidently a rare condition, and hoped by a review of the literature to substantiate his position. Such a search, however, failed utterly to bring to light a single report where more than one neoplasm that could be indubitably classified as a true fibroma had been found at one time in a case, so that a discussion of duality or multiplicity of growth from this standpoint is barred and can only be taken up on the ground of the case presented. During this search the literature of the subject was reviewed during the last few years without the discovery of very much that was new or at variance with opinion quoted a short time back in the essays referred to above. For the most part these monographs consisted in case reports and continuations of the older discussion as to the etiology, the advantage of the external route, the transmaxillary route or the natural passages as the approach for operative removal, and the arguments pro and con in regard to electrolysis, injection, avulsion, etc. These will be briefly summarized later.

*Candidate's thesis to the American Laryngological Association, 1917.

The case that drew the attention of the writer recently to this subject appeared to him to be a case where there coexisted in the same patient a nasal and a nasopharyngeal fibroma as distinct and separate entities. There is a doubt expressed in many papers as to the similar nature of fibromata when found in these different locations, and some authors even go as far as to say that nasal growths are really but nasal prolongations of the nasopharyngeal tumor, and vice versa. It is taken for granted here that it is an accepted fact that true fibromata dura may be found with their insertions in either cavity, thus constituting a true nasal or a true nasopharyngeal fibroma, as the case may be, exclusive of the often noted fact that prolongations of the original tumor may and frequently do, invade neighboring cavities and form more or less dense adhesions there, sometimes simulating true attachments. In fact, one case is on record by a most competent observer, Richardson,[1] where there were two distinct pedicles in a case of the nasopharyngeal type operated upon by him.

As before stated, there are few allusions even to the possibility of there being more than one growth in a given case. Ballenger,[2] indeed, says such tumors are "usually" single, and Pierce[3] makes the statement that they are "never" multiple, although they frequently form secondary attachments by pressure erosion and adhesion. Wells[4] uses the term "fibrous polyp" for the more characteristic one of fibroma and says these tumors "occur as a rule singly," and that they seldom recur. This latter statement hardly agrees with the generally accepted view, where the tendency to recurrence is one of the three cardinal causes of failure to cure by operation, the others being hemorrhage and death during operation. He also notes a tendency to "infiltrate" surrounding bone cavities. It is well known that absorption by pressure of neighboring bony structures is often caused, as well as invasion of cavities through the natural ostia, but infiltration of the bone is a characteristic of true malignancy. The above mentioned writer reports three cases removed without difficulty with the cold wire snare. Two of these cases were in girls, which lays them open to the suspicion of not being true fibromata, and in one of these the pathologic diagnosis was a "fibrous polyp," while in the other it is not given. Moreover,

in the last case (the one diagnosed as "fibrous polyp") four large masses were removed. This is the only case which has been found in which more than one growth was present, and in this there seems to be a reasonable doubt whether these four masses were traced to separate and distinct pedicles and, if so, whether they were not in reality mucous polypi presenting much fibrous tissue.

I wish here to protest against the continued use of the term "fibrous polyp" as applied to fibromata. It is not histologically correct, since these tumors have no etiologic, clinical or histologic relation to mucous polypi, which by common consent are now understood to be meant when the term polyp is used; their only point of resemblance being the pedunculated form that they sometimes assume. In searching the literature, one is constantly misled by the use of this term, when a study of the article shows finally that a fibroma was meant, or not meant, as the case may be. Since there is such a pathologic condition as a true mucous polyp showing fibrous change, the term should be confined to descriptions of these, and much confusion would be thereby avoided. These are by no means uncommon, but their course and treatment are entirely different and relatively simple.

Stucky[5] has never seen a case exhibiting a multiple growth, although many are lobulated, nor has he seen any fibroma which any cold snare would cut through; while Lincoln.[6] reporting a case of nasopharyngeal fibroma removed by external preliminary operation, remarks that such growths are comparatively rare, "arising in the nasal chambers and unaccompaniel by similar growths in the nasopharynx," thus by inference suggesting that they do at times occur in combination. So much, or rather so little, have I been able to find concerning multiple growths.

There are some points of interest in regard to the etiology and, in particular, to the point of insertion of these growths, in reference to a distinction between the nasal and nasopharyngeal type of these neoplasms, many observers holding the view that they are two distinct types of growth. Thus Getchell[7] states his belief that nasopharyngeal fibromata should be classified as being distinctly different from nasofibromata. He bases this belief on the well known facts that nasopharyngeal

fibromata almost invariably occur in young males near the age of puberty and have a marked tendency toward recession at about the age of twenty-five, if the patient does not succumb before that age is reached. Nasal fibromata, on the other hand, are found in either sex and more often in those past middle life. Wright[8] states the commonly accepted fact that nasopharyngeal fibromata have their origin in the dense fibrous tissue and periosteum on the under surface of the basilar process of the occipital bone and the body of the sphenoid; and Getchell believes that many growths now classed as nasal should be put in the former class, although their origin is from the face of the sphenoid or the sphenoethmoidal recess. One of the two cases reported by him had such an origin. Casselberry[9] draws a marked line of distinction between these two types. Most of the cases reported by him occurred after the age of twenty-five, in contradistinction to the early age at which nasopharyngeal fibromata appear and disappear. Chamberlain[10] calls attention to the above mentioned distinction and to true "fibrous polypi" (not fibromata), and quotes Zarniko showing that they are two distinct entities. He reports four cases operated upon, three successfully and one with recurrence, but suggests that only two, being sessile tumors, came within Zarniko's classification as true nasopharyngeal fibromata. From the descriptions given, however, it would seem that the two pedunculated tumors were of nasal origin, since the histologic diagnosis was true fibroma in each case. Four cases in the hands of one man in a comparatively short space of time is a larger number than happens to most laryngologists.

Many observers believe that the true nasal fibroma is a rare growth. Casselberry, quoted above, reports a case of nasal fibroma in 1898, successfully operated upon by him, and comments upon the generally considered rarity of the condition, although he adds two authenticated cases collected from the recent literature of that time, and many more have been added since. While for many years the effort was constantly put forth to prove that all these fibrous growths had the classical origin assigned to them, namely, the base of the sphenoid, the basilar process of the occipital and perhaps the two upper cervical vertebra, and that nasal growths were but extensions from these, in recent years there is a marked tendency to take

the opposite view and give all fibromata a nasal orgin with the nasopharyngeal masses as being merely secondary. Thus Herbert Tilly[11] thinks that most of these growths are "post-nasal," in that they spring from the sphenoethmoidal recess rather than from the vault of the pharynx; and while Moore's[12] case had a very broad nasopharyngeal attachment, yet when this was liberated, the growth apparently had its insertion where Tilly believes they always arise. Uchermann[13] has removed a number of these tumors by the transmaxillary route. He believes that in operating in this way he has discovered that the insertion is usually, if not always, from the face of the sphenoid and the sphenoethmoidal recess, the tumor spreading thence into the nasal chambers, accessory sinuses or into the nasopharynx, and that all other attachments are secondary and due to adhesions. This is certainly contrary to the generally accepted idea that those growths classified as nasopharyngeal spring from the occipital bone and the upper cervical vertebra, although he is supported in this view by D. Jacques.[14] This author says that until recently opinion was almost unanimous that the origin was always from the basilar process of the occipital bone and the two upper cervical vertebræ, and that all other points of attachment were adventitious; that the tumors only secondarily invaded the cavities of the face.

Jacques argues from the history of many of these cases that as one choana is usually obstructed before the other, the growth must have its origin in one nasal chamber, and supports this view by reports of eight cases studied and operated upon by him, in each one of which he found the true attachment in the sphenoethmoidal recess or on the face of the sphenoid. In corroboration of this view he quotes Texier, Raoult, Moure, Latour, Gautier, Duverger, Beca, Lafitte-Dupont, Castex, Escat, Sieur and Gaudin. He seems to believe that all fibrous tumors spring from the nasal passages and that the attachment to the occipital bone and cervical vertebra so commonly found are merely adhesions. Such adhesions can be easily separated, while the true insertion invariably is to the bone, and bony spiculæ are removed with tearing away of the growth. Jacques and Escat also note

the predilection of these tumors for the left side, a fact I have not seen noted elsewhere.

It seems to me more rational to believe that these tumors may have their origin either in the nose or nasopharynx, and that they are identical except in the location of their point of insertion, and this in spite of the apparent differences of age and sex in which they occur. Certainly a tumor of the nasopharynx, with prolongation into the nasal chambers, as reported by Ballenger and many others, must not be classed as a nasofibroma or, vice versa, one arising from a nasal insertion with a nasopharyngeal extension, adherent or otherwise. As a matter of fact, many of these socalled nasal fibromas are not true "hard" fibromata at all, but polypi showing a large amount of fibrous tissue, fibrous polyps, as they are often and truly called. These have their origin in sinus disease and are misleading unless a careful microscopic study is made. Several times I have thought that I had cases of fibroma dura until undeceived by the microscope, and the literature abounds with reports of such cases.

There is a very definite belief that neoplasms of the nasopharyngeal type show a marked tendency to atrophy and disappear after the patient reaches early adult life, if indeed he can succeed in living that long. Cases reported by Ingals[15] and Swain[16] of vascular sloughing fibromata bear this out. In their cases numerous terrific hemorrhages took place after spontaneous sloughing of parts of the tumor, and after each one the tumor decreased temporarily in size, only to take on renewed activity and growth until, for some reason, the limit was reached with the eventual disappearance of the neoplasm forever. But, of course, in these cases much irreparable damage was done, although the mere fact that life is saved may always be considered a satisfactory result. In Ingals' case, where there was present a large nasal extension of the tumor of the vault, operation failed to prevent recurrence, but there was spontaneous absorption in a few years. Great damage had in the meanwhile been done, however, including the loss of sight in one eye, which emphasizes the fact that one cannot afford to allow these patients to go untreated for more than a short time in the hope of a spontaneous cure. That atrophy does not always take place at or about the twenty-fifth year,

and yet may do so later, is illustrated by a case of Pierce's, of nasopharyngeal tumor in a male of thirty-one years, which disappeared under observation by spontaneous involution. A number of simliar cases are cited by this author, and Gibb[17] makes the same assertion, so that there are many in accord in the belief that spontaneous disappearance should not be waited for in other than exceptional cases, as the risk of damage or ultimate failure to atrophy is too great. Holmes,[18] on the other hand, writing in 1902, had observed spontaneous reabsorption in two cases at the early age of twenty-one, after operation had been unsuccessful in preventing recurrence due to inability to entirely eradicate the mass. It is with the hope of such a spontaneous cure in mind that the injection treatment advocated by Harmon Smith[19] and others probably had its greatest value. Smith has had signal success in coping with this condition by injections of monochloracetic acid, and lactic acid has also been used successfully. He reports two recent cases thus treated with decided reduction in size of the tumors. Other operators have reported similar results, although the method does not have very general support, due to the fear of hemorrhage from the sloughing masses. Where a tumor is causing much distress and it is desired to carry the patient a short time, hoping for a spontaneous cure, much may be accomplished in this way.

The probability of recurrence is universally recognized, and the main object of a complete removal is to minimize this danger. McBride[20] states the general opinion of the profession that the greatest probability of recurrence is when a stump is left and many efforts have been made to eradicate this stump by caustics, electrolysis, radium, etc., all more or less successful at times. Reports of recurrences are numerous in the literature, as reviewed above by Holmes, due to inability to entirely eradicate the base. Kelson[21] comments on a case of his own, where recurrence took place two and one-half years later, and Horne, in discussing this paper, says that the mother part of the tumor must be gotten away, for such tumors at times kill by metastasis. While this latter statement is undoubtedly true of fibrosarcomata, a closely allied neoplasm, it is not generally accepted as applying to true fibromata. That such recurrences may be long delayed is empha-

sized by Lamberk Lack,[22] whose case went without recurrence for twelve years, only to show renewed growth after that time.

The chief obstacle to a complete eradication of the insertion is profuse hemorrhage at the time of operation, and this varies very much in different cases, due probably more to an increased vascularity in certain growths than to the mode of removal, although this is a very important factor. Many share the belief of the writer that if the growth can be torn away at its very insertion, which is not always possible, the hemorrhage will be less than if the stump is left, making it impossible for the blood vessels to retract. Richardson and Gibb, quoted above, are in accord with this view, and Stucky finds that the growth can be loosened, during avulsion, by rocking as a dentist does a tooth before final detachment. Both Gibb and Richardson are on record as believing that if the growth is removed completely and with its attachment, there is little danger of extensive bleeding. Although doubtless this is true in many cases, yet there must be many where the bleeding is profuse in spite of thorough removal, and thorough and quick removal is not always, or even often, easy of accomplishment in large tumors with extensive attachments, either primary or secondary, and with numerous prolongations.

Delavan[23] has again called attention to his position, taken in earlier papers,[24] [25] that the old method of removal, practiced by the general surgeon, by extensive preliminary operation, is unjustifiable in view of the results obtained by Voltolini and Lincoln[26] by the use of electrolysis and the galvanocaustic snare, and by Doyen, with his operation for removal by the natural passages. The technic of these operations has reduced the previous high mortality to almost nil, and these are the procedures now in almost universal use in the American and French schools. A review of British literature of recent years, however, shows that the tendency there is still to consider the formidable external operation, preceded by tracheotomy. If removal is attempted per via naturales and without the aid of electrolysis, avulsion in some form or the use of the cold wire snare where possible, seems to be the procedure of choice in this country.

A case history is appended which illustrates some of the points discussed in the preceding brief review. It seems to the writer to be unique, if his belief is correct that there were coexistent nasal and nasopharyngeal growths present. The other features of the case are commonplace, although every case reported helps to swell the record of what is, after all, not a common condition. A period of four months is too short a time to infer much in the way of immunity to recurrence, but it is at least something gained.

HISTORY OF CASE.

This case that came under my observation recently, seemed to me to present sufficient interest to warrant a brief report and comment on fibromata of the upper air passages.

Jacob W., age fifteen years, presented himself at the Out-Patient Department of the Pennsylvania Hospital on December 8, 1916, complaining chiefly of nasal obstruction. He was somewhat underdeveloped, although not flat chested, had a moderate degree of anemia, and a sallow, unhealthy complexion. Mentally he was well developed for his age and condition, though presenting evidences of aphrosexia. Nasal breathing was almost entirely absent, a very small amount of air being forced through the left nostril on forcible expiration. The nose was prominent and broad at the base and toward the bridge; the mouth open; jaw relaxed; chin somewhat underdeveloped.

According to the history given, he had none of the diseases of childhood except measles. He had been healthy and not a mouth breather until about five years previously, when, at about the age of ten, he began to suffer from nasal obstruction, most marked on the right side. This was diagnosed as due to an adenoid growth, but operation was refused. Nasal obstruction progressed, and in the course of a couple of years became almost complete. He had no epistaxis, the ears were practically normal, had no headaches in particular, but had a great deal of nasal discharge, which he was unable to rid himself of by blowing because of the obstruction.

Nasal examination showed the septum markedly deviated to the left posteriorly, crowding against the left turbinals and occluding the inferior and middle meati. The right inferior turbinal was enormously hypertrophied anteriorly and the right

middle very considerably so. A view of the posterior portion of the right nostril could not be obtained. By posterior rhinoscopy, the nasopharynx was seen to be filled with a hard, grayish red mass that had the characteristic appearance of a fibroma, and this diagnosis was made. The tonsils were small and the walls of the pharynx dry and covered with thick, tenacious, yellowish mucopus.

On December 15th, a partial resection of the large right inferior turbinate was done after failure of refraction to give an adequate view of the posterior part of the nasal chamber. A large low spur was now discovered projecting from the right posterior portion of the septum. A good view of the posterior portion of the right naris being now obtained, the choana was seen to be filled by a fibrous mass, apparently having its origin in the sphenoethmoidal recess and extending backward through the choana. This I believed to be either a nasal extension from the pharyngeal growth with adhesions in the nose, or a nasal fibroma extending into the pharynx with adhesions there, for this latter portion seemed to be attached to the bodies of the upper cervical vertebra. Manipulation through the nose with a probe, however, indicated that the upper or nasal growth, or portion of the growth, was distinctly pedunculated. Exact determination of points of attachment was impossible on account of the size of the mass and its closeness to adjacent structures, the septum being markedly deflected to the left by its presence. Following the turbinectomy several weeks were allowed to elapse to get rid of the bleeding and scab formation, which was very annoying, to study the tumor and to attempt to check the suppuration and inflammation in the nasal chambers and nasopharynx in order to have a cleaner field for further operative procedures. On February 1st an attempt was made to snare the nasal growth through the nose, a light, cold wire tonsil snare being used but without any success, as the wires either broke or pulled out of the eyelets. The growth was, however, easily encircled and appeared to be distinct from the pharyngeal mass. These attempts were made under local anesthesia. A week later, on February 8th, the patient was placed in the ward, and on the 9th a further attempt to remove the fibroma was made under warm ether vapor narcosis. A large, powerful Lewis tonsil

snare carrying the heaviest piano wire (Numbers 9 and 10) that could be threaded into it, was passed through the nose as in the previous attempt. The loop was carried into the pharynx and directed around the sessile pharyngeal growth with the finger in the mouth. Even these heavy wires, twisted and tied into the eyelets, simply pulled out straight, without leaving so much as a mark on the tumor. The same thing occurred when the growth was attacked through the mouth with the aid of a palate retractor, and also when the pedunculated tumor was encircled. Altogether six wire loops were spoiled, when success by this method was depaired of. With all preparations made to stop hemorrhage and to perform a tracheotomy, the pharyngeal growth, which appeared to be attached to the bodies of the cervical vertebræ upward to the basilar process of the occipital bone and extending from side to side of the pharynx and to the lower border of the velum palati, was seized with a very heavy, powerful modification of Löwenberg's adenoid forceps, and, both hands locking the handles, with a rocking, wrenching, twisting motion and using a great deal of side force, the growth was detached after about five minutes' continuous work. Scarcely any bleeding followed. The growth measured 3 by 4½ by 2 centimeters, and was complete and covered uninterruptedly with mucous membrane, except on its large flat posterior surface where its attachment was. This raw surface showed fibrous bands and fragments of periosteum where it had been avulsed from the vertebræ and the occipital, and the finger in the nasopharynx easily felt denuded bone in several places. The operation was now considered finished, as it was thought that the whole tumor mass had been delivered at once, but the little finger of the left hand forced through the right nostril and meeting the forefinger of the right hand through the mouth at the right posterior naris detected a pedunculated tumor still partially occluding this orifice. Again an attempt to snare this failed, and again the forceps were used through the mouth, being now guided by the finger in the nostril. The growth was seized and avulsed as in the previous procedure when, to my surprise, a mass almost identical in size and shape to the one first removed was delivered, the only difference being that this second growth had a small pedunculated area of attachment.

No portion of either growth showed any place where it could have been attached to the other, so that I was forced to conclude that I had been dealing with two distinct and separate tumors. The right nostril was now entirely patulous, and the finger in the nasopharynx found a large cavity to the right of the median line in the sphenomaxillary fossa, the limits of which could not be reached, and which was apparently caused by the pressure backwards of the nasal growth. My impression from this examination was that there was some absorption of the basilar process of the occipital and of the sphenoid, but subsequent X-ray studies failed to substantiate this. Although the hemorrhage was slight, the nasopharynx and right nostril were tamponed with gauze soaked in tincture of iodin and tincture of benzoin for twelve hours. The ether anesthesia, being skillfully given, had been light, and the patient reacted promptly and without shock, breathing easily through both nostrils on the removal of the packing. Since that time he has done well and there is so far no suggestion of a recurrence. He breathes easily through the nostrils at all times and keeps his mouth shut, even at night. His color has improved, he walks erect with his shoulders back instead of hunched forward as formerly, the froglike appearance of his face is disappearing, his eyes are bright, appetite good and he is working. His only annoyance was that every morning a large bloody crust came away from the nasopharynx for the first two months, but that has now ceased. He is rapidly gaining in weight and strength. After some weeks the area of denuded bone had granulated over, but had not been entirely covered with mucous membrane. There is a tendency on the part of the amputated right interior turbinate to hypertrophy, as I have seen occur in some cases of atrophic rhinitis when the ozenatous process has been arrested by vaccine, and the deviation in the septum is less apparent now that the pressure on its right side has been removed, thus allowing more air space on the left. It seems, however, that the left choana as well as the right was blocked by one of the fibromata. Nearly four months have elapsed since the operation.

The report on the specimens by Dr. A. G. Ellis, of the Ayer Clinical Laboratory of the Pennsylvania Hospital, was that they were pure hard fibromata.

The interest in this case seems to lie, first, in the presence of more than one growth; secondly, in the typical shape, position and attachment of each growth; thirdly, in the difficulty of removal by the cold snare, but the facility with which they were removed by avulsion; fourthly, the apparent completeness of removal, and lastly, in the almost entire absence of shock or hemorrhage, despite the rough manipulations. I will briefly discuss these points in detail.

1. Although I believe the presence of more than one true fibroma in an individual is a rare condition, I am compelled to believe that it existed in this case. On reviewing the results of the early nasal examination as outlined above, this seems to be somewhat clearly indicated, and the fact that two large masses were removed by avulsion, each having widely different attachments and without any visible evidence of having been attached to each other, makes it almost certain, for I cannot conceive of any force that could be applied that would have torn any portion of these growths away from the main body. Indeed, so though were they that the snare wires did not even leave a mark, and the scissors on my instrument table failed to cut them after their removal. I am sure that, had they been parts of the same growth, that the second would have been delivered with the first.

2. Another reason for believing them separate entities is the shape and position of each. The nasofibroma had its attachment in the region of the sphenoethmoidal recess, a common situation for such growths, and moreover it was very distinctly pedunculated, the body of the tumor pressing the septum to one side and then extending backward into the vault of the pharynx and the sphenomaxillary fossa. On the other hand, the pharyngeal fibroma occupied the typical position for such a growth on the anterior bodies of the upper cervical vertebræ and the basilar process of the occipital bone. The attachments in each case were the periosteum, which stripped off, leaving large areas of denuded bone, which indicates that they were not adhesions caused by pressure and erosion. Aside from the fact that the area of attachment in the nose was small and in the pharynx large, the two tumors were almost identical in size and shape, the nasal being, if anything, the larger and having a rather small prolongation or neck.

3. The hardness and toughness of the tumors, aside from the histologic diagnosis of fibromata dura, would easily exclude the socalled soft fibroma or fibrous polyp, which is frequently multiple but which is simply an ordinary mucous polyp that has undergone some fibrous change. These latter are easily removed with the cold wire snare, but a true fibroma rarely can be, although I thought it might be done with a very powerful instrument. The avulsion was accomplished by exerting considerable force in different directions and finally twisting the growths loose, and doing the whole thing slowly.

4. The tumors were apparently removed root and branch, as an examination of their bases showed periosteum, and in no other place was the smooth surface broken; an examination of the nose and pharynx failed to reveal any evidence of a stump remaining. Avulsion, therefore, when it can be practiced, seems to me more ideal in this respect than the use of the galvanocautery, snare or sharp cutting instruments, since these of necessity frequently leave the base of the tumor behind, from which it may recur.

5. The absence of shock I can only attribute to the very careful and skillful way in which the anesthetic was handled, the patient being just sufficiently "down" to be quiet and unconscious, and to the avoidance of very direct or sudden pulling on the forceps. Instead, minutes were consumed without relaxing the tension for a second, and the tumors slowly and gradually loosened, as suggested by Stucky, and finally torn away. Of course, the points of attachment and the small amount of absorption were probably great factors. I saw one case a few years ago, in the hands of a very skillful colleague, which died on the table just after the avulsion of the growth. This case has been reported. The anesthetic was not nearly as well administered as in my case, and I always felt that the cause of death was largely attributable to the anesthetist. Milligan[27] cites a case of his own where an unexplained death occurred shortly after an otherwise successful operation for removal. The almost total lack of hemorrhage in my case, I think, was due to the slow avulsion and twisting loose of the tumors, to the fact that the entire tumor masses were removed intact and to the added fact that they were so very dense and therefore not very vascular. Where portions of a fibroma are

left it is reasonable to suppose that the severed arteries cannot retract, just as was frequently seen in early tonsillectomy operations where portions of hard, fibrous tonsils were left in situ. In these cases the hemorrhage almost invariably ceased when the remainder of the tonsil was excised.

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XVI.

LINGUAL ABSCESS.*

By John A. Cavanaugh, M. D.,

Chicago.

Within the past year I have seen two cases of tongue abscess, one an acute, the other a subacute or chronic. In my survey of the English writings I was able to find but very little in the texts or current literature dealing with this subject. The following are a few of the texts and what they have to say on this subject:

"American Practice of Surgery," by Bryant and Buck: "Chronic abscesses are generally secondary to trauma, syphilis or tuberculosis. They are circumscribed, less prominent than cysts, not painful or tender, and usually situated in front of the circumvallate papillæ. In doubtful cases insert exploratory needle."

"A Treatise of Surgery," by Geo. Ryerson Fowler: "Abscess of the tongue is usually the result of a breaking down of a gumma situated in the median line and usually pursues a chronic course."

"Practice of Surgery," by Walter Geo. Spencer: "Subacute abscess may be set up by the bite of a tooth or foreign body and may be confused with gumma, tuberculosis, actinomycosis and cancer. Should be incised and its contents and wall examined."

"Manual of Surgery," by Rose and Carless: "Usually of a chronic nature, situated in the anterior part of the organ. Due to admission of microorganisms through some superficial lesion which has quickly healed. It presents as a tense swelling. Free incision settles diagnosis and cures case."

"System of Practical Surgery": "Chronic abscess rare. Due to swelling which has been circumscribed from the begin-

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ning. In some cases reported are undoubtedly confused with suppurating actinomycotic nodules."

"Surgical Diagnosis," by Albert Berg: "Chronic abscess very painful and fluctuates."

"Surgical Diagnosis," by Alexander Bryan Johnson: "Indicated by severe septic symptoms, high fever, rapid pulse. Localized pain and tenderness. Sometimes fluctuation can be felt from floor of the mouth, less commonly upon the dorsum of the tongue. Fatal cases from general sepsis or aspiration pneumonia have occurred."

"Keen's Surgery": "Acute abscesses not very common, may occur in the course of an acute diffuse parenchymatous glossitis, although it seldom does. There are two forms of the acute, the superficial and the deep. The acute superficial occurs usually at the dorsum of the tongue toward the base, invariably in front of the circumvallate papillæ. Deep acute abscesses may arise during the process of acute parenchymatous glossitis. Sometimes found in true mercurial glossitis. May follow infliction of a puncture wound or entrance of foreign body. When abscess forms, the pus is so deep that fluctuation is never an early symptom. Such an abscess may be taken for a gumma unless preceded by acute general glossitis."

After a résumé of these writers I felt this subject should be worthy of our consideration.

I believe the reason for this organ being so seldom affected by such a process is due to its wonderful blood supply, which makes it very resistant. Dr. Jos. Prenn suggests that the abundant various organisms harboring in this region probably establishes a local immunity. Abscesses, I presume, can form in any part of the tongue, but in the cases reported and in my cases, they were in the base of the tongue.

The cause of these abscesses is vague, but I believe some form of trauma, which lowers the resistance of this organ, and the virulence of the invading organism is the most logical etiologic factor.

The symptoms will vary as to the location of the abscess, the length of time it has existed and whether it is an acute or a chronic process. Wright and Smith say the chronic form usually occurs at the base of the tongue near the center, and

may exist for years without symptoms except for a sensation of a foreign body, cough or a feeling of difficulty in swallowing. This coincides with one of the cases I will report.

The acute cases are characterized by a gradual onset, pain in the throat, and in the tongue when moved, which may be referred to the ears or down the neck. The tongue is swollen at its posterior part and very tender when pressed upon by the tongue depressor or palpated. The patient usually has chills, and fever ranging around 101. The cervical lymphatics are swollen and tender, speech is interfered with and painful. Edema of the surrounding structures may be present, depending upon the virulency of the process. Respiration may or may not be impeded. The patient refrains from eating because of the pain in swallowing.

The chronic form has the character of a circumscribed cyst. There may or may not be pain, but if present it is slight and the tongue feels stiff and awkward in its movements. There is the sensation of something being in the throat, and the patient tries to swallow it or cough it up. A local swelling may or may not be apparent on the surface of the tongue. There is no interference with deglutition. The chronic abscesses never attain a large size, usually about the size of a hazelnut. History as a rule is vague.

The prognosis in the acute cases should be guarded; whether the abscess be opened or not, serious complications may follow. The chronic cases are usually favorable.

The diagnosis may or may not be easy and will depend upon the stage in which the patient is observed and the clinical manifestations. In the acute cases one is liable to attribute the condition to a glossitis.

The patient refuses to open the mouth very wide in some cases because of pain. The posterior part of the tongue will be swollen while the anterior part is apparently normal. Extreme tenderness to pressure over the swollen area; if fluctuation can be determined will assure one of a positive diagnosis.

The diagnosis of the chronic cases will be more difficult, and I believe many of these cases go undiagnosed and called globus hystericus. I transilluminated both the cases I had with the pharyngoscope, placing it under the tongue and well back on both sides, and saw a well defined dark area which

localized the abscess in both the acute and chronic case. I do not mean to convey the idea that this is evidence of an abscess, but another link in the chain of findings. If the tongue was greatly swollen this could not be done. A cyst will not be tender on pressure—there will be an absence of pain, and the introduction of an aspirating needle into the swollen mass will verify the diagnosis.

A deep seated parenchymatous gumma, usually located in the dorsal aspect of the tongue, can be felt as a round or oval tumor—very indolent—producing little or no pain and not tender to handle. Multiple gumma is more common, but may fuse and then become an irregular mass. It usually breaks and produces ulceration, but may remain unulcerated for years. Wassermann, clinical signs, and mixed treatment will make clear the diagnosis. Actinomycosis, tuberculoma, lipoma, lingual goiter, fibroma, sarcoma and carcinoma will have to be differentiated from the chronic abscess formation, but the history, clinical and microscopic findings will clear up the diagnosis.

The treatment will resolve itself into draining the abscess, which can be done by an incision with a long curved bistoury, through the long axis of the tongue into the abscess cavity. Dr. J. V. White of Detroit and Dr. James Prenn of Boston, in the cases they reported, made the incision under the tongue at the side and parallel with it. If the posterior part of the tongue is greatly swollen this area will be more accessible. In acute cases the patient should be under constant observation and should be placed in a hospital and a tracheotomy done if necessary. I do not believe palliative treatment should be resorted to after the diagnosis is made.

The following cases will illustrate these two types of abscesses more clearly:

On the morning of April 5, 1917, I was called to the home of Mrs. K. M., aged twenty-seven years. She was in bed in a semisitting position. Her color was good, but she had an expression of anxiety. Speech seemed to be difficult and breathing rather labored. Temperature, 101; pulse, 120; respiration, 24. No apparent swelling of the neck, but palpation caused the patient to flinch and say it was painful; cervical glands enlarged. When asked to open the mouth

did so slowly, and opened it about half way, saying it hurt to open wider. Marked coated tongue; when asked to protrude it did so slightly, complaining of pain. Anterior half looked practically normal in size, but the posterior part was swollen about twice its normal size and very tender to pressure. The tonsils were swollen and débris present in the crypts. Some edema of the uvula. With a laryngeal mirror I was able to elevate the palate and examine the base of the tongue. The epiglottis was swollen about twice its normal size and pushed back over the laryngeal opening, so I was unable to see into the larynx. I did not try to pull the epiglottis forward, as I thought any manipulation might tend to increase the edema. Palpating the mass, I was sure I could ascertain fluctuation. She was eight months pregnant. Present trouble started about one week before; had a stiffness of the neck and throat, and used the ordinary home remedies for three days, but did not improve. She could not talk well and it hurt to eat, so she went to see her family doctor who said she had tonsillitis and treated her for the same.

She went to see him again in two days, as her condition seemed to be growing worse. He painted her throat with medicine and told her to continue the treatment. That night she had a choking spell and could hardly breathe. The family doctor was called, and he recommended hot applications for the neck and a gargle. The next day her condition was worse and the family insisted on consultation. The doctor then gave antitoxin and suggested waiting. The following morning I was called.

Previous History.—Patient has always been in good health except for sore throats. Was married last July.

Family History.—Father and mother living and well. She has four brothers and three sisters living and well; one sister was drowned in the Eastland disaster.

I ordered the patient sent to the hospital, and on the afternoon of the same day I operated. She could not lie down, so I had her retain the sitting position and applied crystals of cocain to the surface of the abscessed area. Having done this, I placed my index finger of the left hand back beyond the mass; then followed with a curved scalpel, making an incision in the posteroanterior direction and in its center. A large

quantity of pus and blood was expelled, and the patient said, "Oh, I feel better." I then made a couple of incisions into the anterior surface of the epiglottis because of the marked edema. Breathing was better, and the patient coughed up a great deal of mucous. She was taken back to bed, and an ice pack applied to the neck. She could not lie down. I ordered instruments ready in case of an emergency tracheotomy, and remained at the hospital to see how she would respond. In half an hour I was called to the room and found the patient gasping for breath. I inserted my finger into the throat and pressed the epiglottis forward. A considerable thick mucous was coughed up, and again she felt better. This occurred three or four times, when it failed to give relief, and the patient became cyanotic. Then I did a rapid tracheotomy, introduced a tube and fed the patient oxygen. She quickly recovered. I made a tent over her bed and kept up continuous steam vapors.

The following morning, April 6th, the patient was feeling very good—temperature, 100; pulse, 130; respiration, 28. That evening she began to have labor pains—temperature, 102; pulse, 140; respiration 32. The family doctor was called and he pronounced the baby dead, and advised watchful waiting.

The following morning, April 7th, I removed the tracheotomy tube and closed the wound, and the patient continued to breathe without difficulty, so I pulled the wound together with adhesive. Labor was induced that morning, and about eleven o'clock I received word that the doctor had delivered a six pound baby girl alive and in good condition. From that on temperature, pulse and respiration gradually returned to normal, and mother and baby left the hospital April 19th, two weeks from the day of entrance.

Cultures were taken in broth media and blood agar. The broth culture showed a cloudiness of the media in eight hours. The blood agar showed a culture present in six hours. A plate blood agar showed hemolysis.

The next case: Miss B. H., aged twenty-nine years, consulted me at my office August 28, 1916, complaining of the feeling of a lump in her throat, which she would try to cough out and swallow. Each time she swallowed it seemed to feel better, but only for a second; otherwise she had no discom-

fort. Gave a history of syphilis and having had salvarsan a couple of times. She had a pyonephrosis of the left kidney Was quite nervous and restless. A blood Wassermann reported negative.

Tonsillar glands were slightly palpable, no tenderness; teeth apparently in good condition; tongue freely movable, but patient said it felt a little stiff. Tonsils small and apparently innocent. No lymphoid enlargement at the base of the tongue or dilated veins. Epiglottis negative, hypopharynx and larynx negative; some small glandular enlargements on pharyngeal wall. Postnasal space negative. I gave her a placebo and had her return in about a week, when I introduced an esophagoscope into the esophagus, but found nothing. I told her to use steam inhalations and apply ten per cent argyrol to throat twice daily. I made my diagnosis globus hystericus. She then disappeared until May 29, 1917, when she returned complaining of some pain in the throat and a feeling of fullness, and said she could not swallow right, as there seemed to be something in the way. Making pressure on the tongue with the tongue depressor caused her to complain of pain. There was no apparent inflammation of the throat, but there seemed to be a little elevation of the dorsum of the tongue of the left side, and palpation revealed a small mass the size of a hazelnut which was tender. Temperature and pulse were normal. I could not detect fluctuation. I transilluminated with the pharyngoscope under the tongue, and a definite shadow outlining mass could be seen. I introduced an aspirating needle and drew off about a dram of pus, from which cultures were made that showed staphylococcus. I incised the mass and the patient made prompt recovery. Broth cultures showed cloudiness and sediment in forty-eight hours; agar slants, a slight culture in thirty-six hours, abundant in forty-eight hours.

The sensation of foreign body in the throat which this patient complained of the past nine months has disappeared, and I believe this abscess was present and lying dormant at that time. It has been suggested that this might have been a broken down gumma, but I did not think so, because healing was prompt, and no specific treatment had been given for over a year. There was no necrotic tissue in the abscessed area.

XVII.

CASES ILLUSTRATING THE DIAGNOSIS OF INTRACRANIAL COMPLICATIONS OF EAR DISEASE COMPLICATIONS.

By G. W. Boot, M. D.,

Chicago.

ACUTE MASTOIDITIS, OPERATION, RECOVERY—EXTRADURAL ABSCESS, OPERATION, RECOVERY.

E. A. O., age forty-nine years, married, American, railroad conductor. No previous ear trouble. Left sided earache in the latter part of April. Applied for treatment two weeks later. M. T. S., red and bulging. Paracentesis. Paracentesis repeated several times in the next few weeks. A mastoid operation done about July 15th. Wound healed promptly with cessation of discharge.

October 7th patient quit work on account of severe left sided headache and dizziness. Vomiting next day. Conjunctiva of left eye congested. Pains in left side of head, radiating to occiput. Two or three days later he had transient diplopia. Some optic neuritis, but not true choked disc. The headache was so severe that it could only be controlled by morphin.

October 13th, three months after the first operation and two and one-half months after the operation wound had healed, the mastoid was reopened but no pus found. On extending the wound upwards and removing the tegmen tympani a small extradural collection of pus was found. Patient complained much of dizziness and headache for several weeks but recovered with practically normal vision.

This case was peculiar in the long time that intervened between the first mastoid operation and the occurrence of symptoms of extradural abscess. The diplopia reminds us of Gradenigo's syndrome except that it was transient. The characteristic symptom was the severe one sided headache. The dizziness is worth noting.

CHRONIC SUPPURATIVE OTITIS MEDIA, TEMPOROSPHENOIDAL ABSCESS—OPERATION—RECOVERY.

April 6th. M. M., schoolboy, aged fourteen years. Has had considerable trouble with his ears, particularly the left one, which would ache, then run for a while and stop, only to repeat the same course a little later. Patient has been unusually irritable for a year. The last attack of ear trouble began five weeks ago as a left sided earache. Next day the ear began to discharge and has not stopped. Three weeks ago he had a profuse sweat. No chills. Temperature normal for the past week. He has not been quite right mentally for three weeks. Has had much headache and has been hypersensitive to sounds. He has complained much of dizziness, but has never fallen. For three weeks has had difficulty in naming objects—for instance, he wanted a baked apple to eat, and said, "I want, you know, one of those round things with juice over it." His memory for names has been growing worse. Today he is semicomatose but resists examination, saying, "Leave me alone." Right drum normal; left, congested with landmarks obscured. Considerable pus in left canal. Left mastoid tender. No spontaneous nystagmus. Pupils equal and responsive to light. Right optic disc reddened with a little edema. Left optic disc normal except for distension of veins. No paralysis of extrinsic eye muscles. No paralysis of the trifacial. Right side of mouth slightly paretic.

During the examination he had a typical attack of tetany. No rigidity of neck. Retention of urine. Urine normal.

Lumbar puncture gave a clear fluid, under increased pressure. No increase in cells. A few diplococci found in stained smears from spinal fluid. Smears from pus in external canal gave a capsulated diplococcus, not lanceolate and occasionally growing in groups of four, arranged in the form of a square.

Mastoid operation under ether. Mastoid diploetic. Pus in antrum. No fistulous opening leading into cranial cavity. Tegmen removed. No pulsation of dura. Cross incision of dura led to immediate loss of cerebrospinal fluid and protrusion of brain. Incision of brain two centimeters deep evacuated between two and three ounces of clear yellow pus,

mucoid in character. Drainage by means of a short rubber tube. Patient did well and recovered.

December 10th. Patient well physically, but rather intractable. Does not attend to his lessons well and memory is poor. The loss of the power to name objects is the important symptom. The other symptoms pointed to increased intracranial pressure, but not to the location of the lesion. He is now serving in the U. S. Navy.

CHRONIC SUPPURATIVE OTITIS MEDIA, SUBPERIOSTEAL ABSCESS IN FRONT OF AURICLE, EXTRADURAL ABSCESS, TEMPOROSPHENOIDAL ABSCESS—OPERATION—DEATH AFTER NINE DAYS.

M. W., age forty years; married; Irish laborer. Patient was admitted to hospital in an irrational condition. Has great difficulty in expressing himself. Apparently cannot recall words which he wishes to use. Can count fingers correctly, but on being shown a knife and asked to name it said "Second." Asked to name keys, he said "Second." For the name of every object shown him he gave the name as "Second." When asked to show how he used a knife he made the motions of whittling. He has a swelling the size of a small walnut in front of the left auricle. No tenderness over left mastoid. No history of tenderness over left mastoid. Left ear has discharged at intervals for sixteen years. Pupils react to light, but are sluggish.

Left mastoid operation failed to find pus in the mastoid except in the antrum. On separating the periosteum from the mastoid forwards in front of the left auricle, a subperiosteal abscess holding two or three drams of pus was found. An opening was found leading from this into the cranial cavity. This was followed up, and the extradural abscess evacuated. The tegmen tympani was removed and a cross incision into the dura above the tegmen made. No cerebrospinal fluid escaped. The temporosphenoidal lobe was incised, and about half an ounce of thick pus evacuated. Drainage by means of rubber tubing. Patient did well for several days, but died rather suddenly on the tenth day after admission. At the postmortem examination there was found an abscess cavity in the left temporosphenoidal lobe of a size

to contain about a half ounce of pus. It had a thick capsule, but had been opened and drained.

Cultures from the abscess cavity gave myriads of typical colonies of a long chain hemolytic streptococcus.

The loss of the power of naming objects was seen typically in this case.

CHRONIC SUPPURATIVE OTITIS MEDIA, CHOLESTEATOMA, MASTOIDITIS, LABYRINTHITIS, DEHISCENCE OF TEGMEN TYMPANI, ABSCESS OF TEMPOROSPHENOIDAL LOBE, MENINGEAL HEMORRHAGE, JAUNDICE.

A. L., single, Russian, tailor. Admitted December 23, 1915, in irrational condition. Says he has been sick three days, but is too tired and too mixed up about it to tell anything, anyway.

He cannot say the words he evidently wishes to say. When asked his age, he replied "thirty." When asked his occupation he replied "the same."

He is very toxic and stuporous and is deeply jaundiced. He has occasional Jacksonian convulsions of right arm and leg, with an occasional twitch of the left side of the face. Eyes deviate to the right. He has a rapid horizontal nystagmus to the right. Pupils pin point in size. The right eye reacts a little to light. Patient cannot be made to look towards the left. He has herpetiform lesions on the lips and margin of the nose. There is a small amount of foul smelling discharge from the left ear. Left membrana tympani has a perforation in its upper part. Patient apparently does not hear the higher tuning forks with the left ear. There is a little spasticity of the extremities, most marked on the right side. The deep reflexes on the right side are increased. Ankle clonus is present on the right side. Tache cerebrale is present.

Spinal fluid shows a clear, pale, yellow fluid, under increased pressure, containing thirty-three cells per cubic millimeter. No Kernig, no rigidity of neck. Leucocytosis, 17,000.

Mastoid operation done the same evening. Cholesteatoma found. Dura over cerebrum and cerebellum exposed. Temporosphenoidal lobe explored with a large needle in several directions. No pus found.

The mastoid operation was then converted into a labyrinth operation. Patient died the next evening. At the postmortem examination an abscess was found in the left temporosphenoidal lobe that had been punctured three times by the exploring needle. It contained thick pus and was surrounded by a considerable area of softening. There was a large subdural hemorrhage over the whole left hemisphere and also hemorrhage into the ventricles and between medulla and cerebellum. The loss of memory of words was marked in this patient. The postmortem shows the error of using a needle for exploring the brain. The location of the abscess had been correctly diagnosed, and it had been entered by the exploring needle but the pus was not found.

ACUTE SUPPURATIVE OTITIS MEDIA, MASTOIDITIS, SINUS THROMBOSIS, ABSCESS OF TEMPOROSPHENOIDAL LOBE, MENINGITIS.

January 1. E. D., female, married, age forty-two years. Patient had a running ear three weeks ago. The discharge stopped after three weeks, but the fever persisted. There was tenderness over right mastoid. She has had pain in the right elbow, shoulder and wrist. This condition resembles acute inflammatory rheumatism. There is an oval perforation one millimeter in diameter in the anterior inferior quadrant of the right membrana tympani with a small amount of discharge.

January 30th. Patient is running considerable fever. No tenderness of right wrist. Considerable tenderness of right mastoid. Hears whisper with the right ear at two feet. With the left at four yards.

Caloric test: Both ears respond, the right a little more slowly than the left. Patient improved until March 5th, when her temperature rose to 105. Pulse 130. Complains of headache and general malaise. No Babinski or Kernig. Leucocytosis of 10,750. Spinal fluid turbid with 1,300 cells per cubic millimeter.

Mastoid operation March 6th. Granulations found in mastoid. Sigmoid sinus found thrombosed. Pus found in temporosphenoidal lobe.

March 8th, patient stuporous; March 9th, general convulsions; March 11th, exitus.

The temporosphenoidal abscess in this case being on the right side, did not give loss of memory for names.

CHRONIC SUPPURATIVE OTITIS MEDIA, AURAL POLYP, CHOLESTEATOMA, FACIAL PARALYSIS, FISTULA OF EXTERNAL SEMICIRCULAR CANAL, MENINGITIS.

K. K., Bohemian, coat presser, age twenty-eight years. Admitted March 7th, with the diagnosis of meningitis.

Patient complains of headache and discharge from the left ear. He is tender over the left mastoid and is not able to close his left eye or use the muscles on the left side of his face.

His troubles began two months ago as a sore throat, followed by left sided earache. Two or three days later the left ear began to discharge. Headache became general and has continued. After four weeks of headache it became worse, and four days ago he noticed that he could not close his left eye and his neck became rigid.

Pupils react to light and accommodation. There is spontaneous nystagmus on looking towards the right, but none on looking towards the left No Kernig, no Babinski.

March 4th. Spinal fluid cloudy, containing 400 cells per cubic millimeter. No bacteria in fluid. Noguchi +. Nonne +.

March 5th. Head retracted, neck very rigid; 11,000 leucocytosis.

March 6th. General condition a little better. Thirty cubic centimeters antimeningitis serum given. Does not appear to hear any of the tuning forks with the left ear. Weber lateralized to the right. Spontaneous nystagmus to the right. Patient lies on his right side.

Irrigation of left ear with hot water causes horizontal and rotary nystagmus to the left. Left eye shows distinct papillitis, some of the vessels being covered with exudate as they pass over the edge of the disc. Right eye not examined.

Mastoid Operation.—A large cavity filled with cholesteatoma found. Polyp in external canal. After removal of the cholesteatoma the bone was found eroded over the horizontal canal and the eroded area covered with granulations. Pressure on the eroded area caused nystagmus to the left. The facial nerve was found not covered by bone. Sigmoid sinus exposed and found normal.

March 20th. Patient is doing well and feeling well. The facial paralysis is improving.

In this case the function of the left vestibular system was interfered with but not abolished, as shown by the nystagmus to the right that was reversed when the left ear was irrigated with hot water.

CHRONIC SUPPURATIVE OTITIS MEDIA, CEREBELLAR ABSCESS, MENINGITIS.

W. S., married, German, laborer. Has had a discharge from the right ear for a year. A week ago had severe pain in the head. Four days ago began to vomit. Admitted to hospital in unconscious state. Neck somewhat rigid. Knee jerks increased. Right pupil larger than left. Both pupils responsive to light. Mastoid operation at 5:30 p. m., when patient had been unconscious six hours. Mastoid eburnated but necrotic over sinus. Pus around sinus. Cerebellum explored but no pus found. Sinus free from thrombus. Patient was perfectly normal the morning after the operation. Vomiting had ceased. Temperature, which was 105 before operation, fell to 98.6. He complained much of frontal headache. Tongue heavily coated. Three days after the operation he developed a crop of herpetic vesicles on the upper lip and right side of the mouth. On this day he complained of severe pain in the back. His constant cry was, "Mein Kreuz tut mir so weh." Nine days after the operation he had nose bleed. Ten days after operation he vomited and complained of headache and was very restless. Thirteen days after operation he was unsteady when he attempted to rise and his neck again became stiff. Two days later he became unconscious and death followed during the night.

At postmortem there was found: Small abscess in right lobe of cerebellum. Soft clot in sigmoid sinus. Purulent meningitis in the posterior fossa of the skull and extending down around the cord. The cerebrum was free from involvement. The cerebellar abscess lay over the saccus endolymphaticus and the track of the exploring needle could be traced almost to the abscess.

The severe headache, the unsteadiness and the pain in the back are the marked symptoms in this case. The herpetic

vesicles three days after the operation probably indicated involvement of the Gasserian ganglion.

SYPHILITIC MENINGITIS, TOTAL LABYRINTHINE DEAFNESS IN ONE EAR, NEARLY TOTAL LABYRINTHINE DEAFNESS IN THE OTHER EAR—TOTAL RECOVERY OF HEARING.

C. F., single, Belgian, laborer, age eighteen years. Patient admitted with the examining room diagnosis of epilepsy. He is apparently totally deaf to the spoken voice. Pupils slightly irregular, reacting equally and promptly to light and accommodation. No nystagmus. Right internal strabismus. Deep reflexes increased.

Five days after admission patient had a convulsion and tried to bite the rod at the head of his bed. Has severe pain. Head tender on palpation and gentle percussion. No Kernig or Babinski.

On the sixth day after admission the ears were examined and the findings noted as follows:

Right ear totally deaf for all the tuning forks and the Edelmann whistle.

Left ear hears the forks from C = 128 to C_4. None of the forks above or below these limits was heard. Bone conduction much shortened, none of the forks being heard by bone conduction.

Right drum membrane much scarred.

Left drum membrane slightly retracted.

Nystagmus on looking towards the left. Irrigation of left ear with cold water gives nystagmus to the right.

Wassermann on cerebrospinal fluid gives a + + + reaction.

The seventh day after admission he was given gram .45 of neosalvarsan intravenously. Up to this time patient had tried to commit suicide four times because of the intense headache. Patient was troubled for several days longer with dizziness, head noises, nausea and vomiting. He had two more doses of salvarsan, and following the last dose was given 90 grains of potassium iodid daily and one-sixth grain of bichlorid of mercury by deep hypodermic injection on alternate days. Under this treatment he recovered his hearing completely in both ears so that he heard from C = 32 to 25,000 d. v. of the Edelmann whistle. Vision was slightly

below normal, so that he could not follow his former occupation of soldering fine wires.

The severe headache pointed to meningitis, but the absence of middle ear suppuration did not indicate a suppurative process. The Wassermann decided the diagnosis. The recovery from almost complete bilateral labyrinthine deafness to normal hearing in both ears was remarkable.

FRACTURE OF SKULL, BILATERAL LABYRINTHINE DEAFNESS.

F. S., married, Polish, laborer, age forty-six years. Patient was struck by a street car and has been deaf ever since. Both drum membranes show congestion along manubrium, but nothing else. Patient does not hear any of the tuning forks by air conduction with the right ear. He appears to hear c = 256 and C = 128 by air conduction with the left ear. He also hears these forks by bone conduction but much shortened.

There is no response to caloric or rotation tests.

The X-ray examination shows a linear fracture running through the right temporal and parietal bones.

Two weeks later he was found to be blind in the left eye. There is primary optic atrophy of the left nerve.

He was discharged on the twenty-third day, hearing from 128 to 4096 d. v. by air conduction with the left ear.

CHRONIC SUPPURATIVE OTITIS MEDIA, CHOLESTEATOMA, MASTOIDITIS, SINUS THROMBOSIS, SLOUGH OF SINUS WALL, EMBOLIC PNEUMONIA, HERNIA CEREBELLI, FACIAL PARALYSIS—RECOVERY.

June 13th. Patient is a young married German laborer. Has had discharge from right ear since childhood. A month ago had right sided earache. No discharge until three days ago. Headache severe.

There is a small amount of whitish discharge in canal. Soon after admission he had a severe chill and temperature of 105.2. Leucocytosis of 14,500. Knee jerks increased.

Patient is very sick and apparently has a beginning meningitis. Simple mastoid operation. As soon as the outer layer of the mastoid was removed a cavity was entered containing a thin brownish fluid under pressure. When the débris in the cavity was cleaned out it was found that the outer wall of the

sinus had sloughed off. Free bleeding was obtained from the upper end of the sinus. The jugular was ligated and cut off and the inner wall of the sinus slit open for about one centimeter in the search for pus. Patient was doing poorly, so the operation was interrupted and he was put to bed. He improved until July 4th, when he complained of pain in the chest and coughed a good deal.

July 12th. His condition having improved enough to warrant it, he was again anesthetized and the mastoid operation converted into a radical. A cholesteatomatous mass was found occupying the upper part of the mastoid, while a reddish fungous mass occupied the cavity cleaned out at the first operation. This was evidently a hernia of the cerebellum, so it was not disturbed. The wound behind the auricle was closed by skin clips.

July 17th. The dressings were found saturated with cerebrospinal fluid. They continued to be saturated for several weeks.

July 25th. A hernia cerebelli has appeared in the mastoid wound where two of the clips have given way.

July 27th. A right sided facial paralysis has appeared. The hernia cerebelli was clipped off and a small compress applied.

August 7th. The facial paralysis has been recovered from. The wound is closed. The hernia is retained within the mastoid cavity, but can be seen in the canal. The discharge of cerebrospinal fluid has ceased.

BILATERAL MASTOIDITIS, THROMBOSIS OF THE SUPERIOR LONGITUDINAL SINUS—JAUNDICE.

H. L., married, German, baker, age thirty-eight years. Admitted May 10th. Patient is deaf, and not entirely rational. He does not understand what is said to him and does not respond to questions intelligently. His wife states that he has been sick for six months, first with articular rheumatism and later with hemorrhages from the nose and mouth. Two weeks ago he became jaundiced rather suddenly and was weak, irrational and restless. At the same time his ears both began to run. He frequently vomited after eating.

There is now profuse discharge from both ears, and both mastoids are tender. He does not respond to hearing tests.

Pupils equal, regular and respond to light. X-ray examination shows both mastoids cloudy. Smears from cerebrospinal fluid give Gram positive diplococci. Cultures from spinal fluid give a pure culture of a Gram positive streptococcus.

May 13th. Double mastoid operation done today.

May 18th. His condition not having improved, the brain was explored, with no results.

May 20th. His temperature, which had ranged from 99.2 to 101.8, jumped to 106. He became hypersensitive, jumping at the slightest touch, and died on the 21st.

Postmortem showed thrombosis of the superior longitudinal sinus. The general interferenec with the mental processes, the nose bleed and the jaundice are important symptoms. The mental incompetency is explainable by the disturbed nutrition of the cortex. The nose bleed seems to have been the result of venous stasis in the upper part of the nose from closure of the superior longitudinal sinus. The jaundice was probably the result of bacteremia.

ACUTE SUPPURATIVE OTITIS MEDIA, LABYRINTHITIS, ANOMALOUS POINTING REACTIONS, FACIAL PARALYSIS—RECOVERY.

B. S., married, Jewish, baker, age thirty-eight years. Admitted November 5th, with the history that November 1st he had left sided earache. Next day his ear began to discharge and he was intensely dizzy and vomited.

On admission he was found to have total labyrinthine deafness in the left ear. There was spontaneous nystagmus to the right. No nystagmus to the left. Past-pointing to the left with the right hand. No past-pointing with the left hand. Purulent discharge from the left ear.

Does not hear any of the tuning forks with the left ear. Weber to the right. Rinné, left, negative (heard in right ear).

November 23. Spinal fluid gives a slightly positive Nonne; twenty-three cells per cubic millimeter. Temperature did not run above 90. His condition improving he was discharged, but returned on November 27th with a paresis of the left facial. This gradually improved and is now well.

In this case the unusual pointing reactions might be explained in two ways: Either he had a cerebellar lesion that

suspended the action of the centers for outward deviation of the left hand or he had a hyperirritability of the center for inward deviation of the left hand. The latter seems more likely, for he has recovered, which would hardly occur with a destructive lesion of the left cerebellum. However, a cerebellar abscess is not positively excluded as yet, though a cerebellar abscess that would cause dizziness, nystagmus and past-pointing would be apt to cause progressively increasing symptoms.

These are brief accounts of some of the complications I have had in ear conditions. From these and from other cases not reported I would conclude that the diagnosis of these complications is not easy, but requires careful examination of the history, the symptoms, the functional tests and the laboratory findings.

In extradural abscess the most characteristic symptom is the severe one sided headache, in a patient who has or who has had a running ear.

In abscess of the left temporosphenoidal lobe the most characteristic symptom is loss of memory for names, with weakness of the facial muscles on the right side If the abscess is in the right temporosphenoidal lobe, memory for names is not lost unless the patient is left handed, in which case it might be lost. Right sided facial paresis may be present.

If the patient has a labyrinthitis, complete labyrinthine deafness, anomalous pointing reactions, headache and choked disc, look out for cerebellar abscess, and when exploring for it, remember that the abscess is apt to lie either near the internal meatus or over the saccus endolymphaticus.

If the patient has rigid neck, positive Kernig and a cloudy cerebrospinal fluid with increased polynuclear count, the diagnosis of purulent meningitis is settled.

In the cases of thrombosis of the superior longitudinal sinus there is a lack of mental ability, an inability to comprehend what is said and to reply, that is quite characteristic when once seen, but which is difficult to describe. Nose bleed is a symptom to which I am inclined to attach considerable importance in the diagnosis of thrombosis of the superior longitudinal sinus.

Syphilis of the vessels, syphilitic meningitis and gumma usually lack the preceding middle ear suppuration. The symptoms are not apt to be confined to one side of the head, and the Wassermann on the blood and cerebrospinal fluid gives an indication of the cause of the symptoms.

In conclusion, I would say that when in doubt it is probably better to explore the brain than to omit such exploration. The exploration is best done by means of a double bladed explorer similar to the one designed by Dr. Gifford of Omaha.

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XVIII.

THE IMPORTANCE OF RECOGNIZING THE RELATION OF EAR CONDITIONS TO THE GENERAL SYSTEM.*

By George E. Davis, M. D.,

New York.

In a paper read before the American Laryngological, Rhinological and Otological Society, May, 1916, I emphasized the significance of recent functional tests in furnishing valuable information in the diagnosis, not only of certain ear conditions and their etiology, but affording direct evidence of the intimate physiologic and pathologic relation of the ear to the whole organism, but particularly to the central nervous system. A comprehensive knowledge of these several functional ear tests, therefore may prove of large importance to conscientious workers in all fields—medical, surgical and neurologic, as well as the specialties of otology and ophthalmology, etc.

In view of the complex structure and multiple functions of the eighth nerve, and its intimate connections through the nervous system, not alone with near but remote regions, it is not surprising that pathologic involvement of this particular nerve not infrequently is manifested by manifold and diverse symptoms, both direct and reflex, and covering a large field.

To properly interpret all these varied symptoms is no small or easy task, and I fear most of us, at times, must plead guilty as slackers, but, unless one is given to systematic and thorough examination of every symptom and tracing the source, accurate diagnosis is impossible and treatment unsatisfactory.

In the report of the cases I make this evening it is not my purpose to go into the details of functional ear tests, with which you are quite familiar, but simply to illustrate the valuable information gained by their practical application in our

*Read before the Section of Otology, New York Academy of Medicine, February 8, 1918.

daily work and their great aid in facilitating accurate diagnosis and correct treatment.

Case 1.—Margaret D., age eighteen years, consulted me September 10, 1917, with the following history:

Nine years ago had adenoids and tonsils removed. Since the operation she has noticed increasing impairment of hearing varying in degree at different times. Some tinnitus both ears. Four years ago she had measles, but suffered no complicating infection with the ears. Three months ago had an operation on the nose. Patient is thin and anemic. Hutchinson teeth, badly decayed. Family history negative as regards deafness and syphilis.

FUNCTIONAL TESTS.

Right		Left
Neutral	Weber	Neutral
Shortened	Schwabach	Shortened
Plus	Rinné	Plus
Shortened	C	Shortened
Moderately shortened	c^1	Moderately shortened
Moderately shortened	c^4	Moderately shortened
5.1	Galton	5.1
24 (2v)	Low Note	24 (2v)

STATIC.

10 turns to right—after-nystagmus 20″ to left.

10 turns to left—after-nystagmus 15″ to right.

Blood Test.—Wassermann negative or feebly positive.

This patient had been treated for eighteen months for chronic middle ear catarrh, without any improvement whatever, but was gradually growing worse.

In view of the lowered air conduction for the middle register, together with the rather marked shortened bone conduction, my interpretation of her case was specific nerve deafness due to hereditary syphilis. Notwithstanding the negative or feebly positive Wassermann antisyphilitic treatment effected decided improvement in her hearing—corroborating the diagnosis. The improvement in air conduction was more marked than the bone conduction.

Case 2.—Marie G., age seventeen years, consulted me January 23, 1918, and gave the following history:

Cerebrospinal meningitis when three years of age. Severe attack. Scarlet fever a little over four years ago, followed in

a short time with measles. No ear complications at the time. Confined to her bed three months, three years ago, with rheumatism which involved the heart and left her with mitral valvular murmur. Noticeable impairment of hearing for past year—probably coming on gradually for some time before. Tinnitus both sides, worse on the right. Both drums slightly retracted and dull. Eustachian tubes slightly constricted. Hutchinson teeth. Enamel worn from the front of the upper incisors as observed following scarlet fever at times. Knee reflexes almost absent. Mentality of a child of eight years.

Family History.—Maternal grandfather was hard of hearing. Mother gave birth to eight months' premature dead fetus. Patient was born three years following the premature birth. One brother, three years younger, is healthy. Father very thin and never very strong.

FUNCTIONAL TESTS.

Right	Weber	Left
Short	Schwabach	Short
Negative	Rinné	Plus
Shortened	C	Shortened
Shortened	c^1	Shortened
Shortened	a^1	Shortened
Short 12″	Bone conduction	Short 14″

Gait unstable and with spreading feet when eyes are closed. Romberg positive.

Static Tests.—No response to turning or caloric tests. Patient said she felt a little dizzy only during the tests.

Wassermann 2 plus.

Notwithstanding the numerous infections suffered by the patient, I feel that the luetic condition is principally responsible for the nerve deafness.

Case 3.—Mrs. Mary M. for four weeks has suffered from severe vertigo. Two weeks following beginning of vertigo she suffered with blowing tinnitus which lasted a week. The vertigo of which she complains is only of momentary durations, brought about by stooping or raising up suddenly. The tinnitus was constant.

Examination shows: (1) Enlargement of thyroid gland, which patient says is of two years' duration. Blood pressure 135 systolic, 86 diastolic. Knee reflexes normal.

(*2*) FUNCTIONAL TESTS.

Right	Weber	Left
Lengthened	Schwabach	Lengthened
Negative	Rinné	Plus
Negative	C	Slightly shortened
Shortened	c^1	Very slightly shortened
Shortened	a^1	Very slightly shortened
150 (2v)	Low Note	24 (2v)

STATIC TESTS.

10 turns to left—after-nystagmus 15″ to right.

10 turns to right—after-nystagmus 20″ to left.

Inspection of drum on right shows large kidney-shaped perforation, curving under handle of malleus, as a result of a suppuration in childhood. The vertigo, I believe, is due to the thyroid condition.

XIX.

THE VALUE OF THE RESULTS IN ANACOUSIA DEPENDS ON THE LOCAL AND GENERAL CONDITION OF THE PERSON WHO IS DEAF.*

By G. de Parrel, M. D.,

It would be unwise to make a prognosis on the possible degree of improvement of deafness and concomitant troubles from treatment by anacousia; too many factors influence the value of the results. The task of the physician having the case in charge consists in placing in action all the forces at his disposal to obtain the best result. With these in view, he will seek out the best method to pursue in order to obtain a clear idea of the functional symptoms, of the general health, and of the conditions of life of the patient. This secured, he will proceed with circumspection and with the most approved technical experience, and will make use, according to indications, of all contributing aids which are at his disposal.

Having ourselves pursued this plan in our extended experience with anacousia, we desire here to draw from it some useful lessons for the employment of the infinitely varied resources which the electrophonoid method offers, according to the nature of the affection, as to the judicious employment of the numerous assisting agencies which are at our disposal in a particular case. Furthermore, we discuss the necessity of supporting the local use of sonorous massage by proper general massage. We will then, in order to divide this investigation clearly, study the value of the results according to:

1. The nature of the aural trouble present;

2. The general health of the patient and the condition of life, age, profession, occupation;

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*Revue de Laryngologie, January 31, 1917. Translated by Major T. J. Harris, M. R. C.

3. The technical employment and the additional aid at our disposal. This latter point will be the subject of our second communication to this congress.

I. The value of the results depends upon the nature of the aural trouble present. Aural nosology has not yet been definitely fixed and, for the moment, it is a question whether possibly the limits established between certain morbid entities are not too elastic or artificial. However this may be, we think that we can give greater clearness to this exposition of the value of the results obtained by anacousia treatment by passing in review the principal functional symptoms rather than the affections, certain of which do not have the name which they deserve, the clinical and anatopathologic table which characterizes them not having been yet perfectly established.

Without fear of insisting once too often, we again emphasize the capital importance which is to be ascribed to the presence or absence of paracusis Willisii. The longer our experience in auditory reeducation, the more we would affirm that every deaf person who hears better in the presence of noise can be benefited by acoustic exercises, and we have already said that a labyrinth excitable to incoherent noises of every nature is by nature still more excitable to a complex sound of infinite variety in pitch and timber capable of modification and regulation at the will of the experimenter. Up to the present time we have never fallen in error upon this point in our practice, and this is why we do not fail to place in evidence and repeat that the presence of paracusis Willisii demands imperatively the trial of anacousia treatment.

Inversely, the determination of a complete ankylosis of the stapediovestibular articulation with a markedly accentuated hypoacousis, impermeability of the tube, shortened Schwabach, positive Rinné with symptoms of vertigo, should make us place a most guarded prognosis upon possible improvement of the hearing, without, however, absolutely contraindicating the trial of electrophonoidal massage, the more so as this does not cause any inconvenience either from the local or general viewpoint.

One of the groups of symptoms most favorable for anacousis is the following: Slowly progressing deafness, not yet pronounced negative Rinné, lengthened Schwabach, positive

Gellé, open tubes, intermittent tinnitus of a low character, not intense, drum membrane only slightly altered in appearance and movable, little or no vertigo, paracusis Willisii, persistent headaches.

Also encouraging, from the point of view as regards anacousis, is deafness in young people with persistent noise (whistling, singing of birds), drum retracted and opaque in appearance, somewhat movable, negative Rinné, some vertigo, restricted movement in the stapediovestibular articulation. Attacked at their onset, these functional disorders can be completely relieved as a result, without doubt of the recovery power of the auditory organ and of the suppleness of the circulation in young persons.

There is a class of symptoms entirely different when we find ourselves in the presence of a semideaf person whose hearing by the aerial route is better than that by bone conduction, who has a Schwabach a little shortened, a positive Gelle, a Weber lateralized to the healthy side, attacks of vertigo of a moderate degree, whose drum membrane shows slight evidence of sclerosis, and in whom finally the upper limit of hearing is lowered. The patient has, in a word, symptoms of a recent chronic labyrinthitis without participation of the windows or of the ossicular chain. We can have recourse to acoustic exercises in such cases with much promise of success, the only condition being that a somewhat different technic be employed, which we shall describe in our second article.

The improvement obtained is not less interesting, although less marked, in the presence of the characteristic signs of impaired movement of the ossicular chain, especially of the stapes, retraction of the membrane, hypertrophy of the mucous membrane or the existence of adhesions, reduced permeability of the tube with negative Rinné, prolonged Schwabach, Weber lateralized to the involved ear, continual and usually peculiar sounds in the ear, such as the noise of sea shells, escaping gas, etc., the sensation of congestion of the head.

Still another table of symptoms demands our attention: A normal drum, a permeable tube, positive Gellé positive Rinné, lowering of the upper limit of hearing, frequent congestion

of the head, especially after eating, labyrinthine troubles, particularly vertigo, hyperarterial tension, exaggeration of the second sound at the aorta, asthmatic dyspnea, etc. Anacousis, in connection with appropriate treatment, serves to combat efficiently in the early stage these circulatory phenomena in their local and radical manifestations, diminishing the vertigo and the noise, stopping the evolution of the process of denutrition and improving at the same time the hearing, finally restoring to normal the arterial tension.

We have already referred to the remarkable drying effect of electrophonoid massage in chronic otorrhea, even in cases of long duration; after fifteen or twenty treatments we often see the discharge decrease, become serous, then at the end of a short time entirely cease without any tendency to recur. Anacousia treatment, as seen by those who employ it, acts upon groups of symptoms altogether removed one from the other, and, as it were, opposed to one another. This therapeutic reaction of anacousia so eclectic in nature has furnished an objection to the critics of this new procedure, who refuse to admit that affections, so different in the functional and anatomic troubles which characterize them, can be equally influenced by one and the same treatment, and nevertheless nothing is more easy than to explain the results obtained by anacousis in soil so varied. It suffices for this only to understand the physicophysiologic mechanism. It perhaps will not be superfluous to describe this here anew, at least in a general way.

The action of graduated sonorous sound is threefold:

1. The stimulation of the auditory organ by the physiologic excitant.

2. Pronounced modifications of the aural circulation.

3. Mobilization of the tympanum and chain of ossicles.

(a) It is not necessary to dwell upon the physiologic principle which defines the remarkable influence, so far as its function is concerned, of normal stimulation on each of the sense organs. The human ear is no exception to this law; the only difficulty consists in being able to furnish it a sound of a physical character entirely similar to that of the human voice, the normal physiologic excitant and of succeeding in regulat-

ing its action by modifying at will its intensity, its height and its timbré. The electrophonoidal apparatus has been constructed by Zund-Burguet with this object in mind, and there is no question but that he has succeeded in his attempt. If we analyze the sounds produced by this apparatus we are able to recognize in it a complete physical identity with those of the human voice. As a result, the problem propounded by Urbantschitsch has been solved.

Auditory reeducation has for its first object the awakening of a function dormant from nonuse or hindered by the degeneration of the tissues and that, naturally, within the limit of the anatomopathologic disorders produced by the evolution of the disease which is the cause.

Just as by exercise we can, in the normal state, develop to a considerable degree, the sight, the touch, the smell, the taste, the hearing, in the same way, by graduated physiologic stimulation can we, in the pathologic state, obtain an improvement of the auditory function or of that part of the auditory function which still remains. One case differs from the other only in the difference of the point of departure and of the difficulty in progression.

(b) As far as that which concerns the action of anacousia upon the auricular circulation, this is proved by the hyperemia of the drum membrane seen by the otoscope after sonorous massage, the sensation of warmth which the patient experiences at the base of the auditory canal and in the external ear, the reappearance of cerumen, and the drying up of otorrhea.

Sonorous sound causes a stimulation of the vasomotor nerves which is shown functionally by a powerful response of the vascular system, an energetic vasodilatation, and by even a pronounced irrigation of the entire auditory tract and the regions adjacent. What are the results of this renewed vascularization? At once a hypernutrition of the mucous membrane of the ear, and as a result a stopping of the process of atrophic degeneration when it exists. If there is a chronic suppuration, these modifications in the circulation bring about a suppression of the blood stasis, and favor the infiltration of round cells through the surface of the epithelium. There are diapedesis and phagocytosis. There is produced on the

other hand an active proliferation and a rapid epidermatization at the base of the old ulcerations scattered over the mucous membrane of the tympanum.

By its remarkable vasomotor effects, electrophonoidal anacousis is antagonistic to the evolution of the lesions of arteriosclerosis of the ear, to endoperiarteritis of the vessels, to spasm of the small arteries, later to the phenomena of necrobiosis through thrombosis and denutrition.

In the double rôle of stimulation of the organ of perception and by modification of the auricular circulation, treatment by anacousis is well indicated also in chronic labyrinthitis and in atrophic sclerosis, as in chronic otitis media catarrhalis or suppurativa.

(c) Let us consider now its action upon the mechanical troubles involving the middle ear, whether through chronic arthritis or from interference with vibration of the osteoarthromuscular system, due to the effect of cicatricial new growth, such as adhesions, bands, hyperplasia of the mucosa, thickening of the tympanic membrane, etc.

The classical procedure for mobilization of the auricular chain and of the stapes is either by the inflation of air in the tympanum through the eustachian tube, by continued traction of the hammer, or by massage of the drum membrane, direct or indirect; the objection to this last procedure is that it does not correspond to the vibratory demands of the middle ear. To mobilize the drum membrane with the Delstanche instrument is to make use of a measure very unlike the physiologic concussion which is furnished to the membrane and the chain by sonorous sound: it is to replace the rapid, gentle effect of sonorous vibration by the brutal, slow action of an artificial concussion produced by manual pressure. Modern use of these various therapeutic measures gives, we are told in our classical treatises, good results in dry chronic adhesive otitis media, but the mobilization of the auditory tract by sonorous sound is much superior because it is physiologic; placed at the head of this treatment of so rebellious an affection, it brings about a much more rapid and complete improvement of the functional troubles, especially that which concerns the improvement of motion of the chain and of the stapes. Anacousis acts like kinesitherapy upon the functional incapacity of a membrane

or an articulation. The machinery of accommodation is subjected to true passive movements which can be varied in amplitude and rapidity according to necessity, dependent upon the nature of the sounds employed. The practice of anacousia has taught us, for example, that in ankylosis of the stapes it is preferable to make use of acute sounds which commend themselves by the brevity of their tones.

The passage of vibrations through the tympanum gives rise to a stimulation of sensitivity and muscular contractibility, shown for the first time by Raoult, and one can easily understand that as a result there is a much greater elasticity of the ossicular joint and a progressive loosening of the adhesions which have formed between the chain of ossicles and the walls of the tympanum.

Another result of this liberation of the osteoarthromuscular system is labyrinthine decompression and the disappearance or, more often, the modification and attenuation of tinnitus aurium.

Vascular sounds (pulsation synchronous with the pulse, whistling, sound of spinning wheel) come in the domain of general therapeutics. As for labyrinthine vertigo, it can frequently be ameliorated if care is taken to regulate the sonorous stimulation in a manner to diminish the hypertension and the congestion of the internal ear.

Conclusion.—By its threefold circulatory mechanical and sensory action, electrophonoidal anacousia has a vast field of usefulness for combating effectively groups of symptoms essentially different one from the other, and this eclectic therapeutics is nothing but the direct consequence of the suppleness, regularity, variety, and power of mixed sonorous vibration, such as is employed in auditory reeducation.

II. The value of the results depends upon the general state of the deaf person and upon the condition of his life.

(a) The General State.—The general state of the deaf person enters to a large degree into the value of the results which we can obtain by anacousia. As Professor Roger has wisely said, living organisms are constructed in such a way that every modification, arising in one point of the system, shows its effect upon the entire system.

Many general maladies have an effect on the labyrinth. Reversely, no disease of the ear remains local; the reactions are more or less marked; although at times imperceptible, they do not the less exist.

It is by the reflex or circulatory route that general functional troubles show themselves upon the ear. As Boulai of Rennes has remarked, the sensory nerve filaments, altered or not, transmit to the region of the ear nervous stimulations, vasoconstrictor or dilatory, spasmodic, hyperesthetic or asthenic in character, from a point of departure far remote, such as the intestines, the genitals or gastric tract. On the other hand, there is often a localization in the ear of an auto-intoxication through involvement of the circulation, renal insufficiency, toxic neuritis or by chronic constipation, visceral ptosis, enteritis, cephalic congestion, etc. It will be necessary, then, to take into account in the prognosis the results of these chronic factors of intoxication and to make the reservation in it which the general examination of the patient demands.

Progressive deafness frequently is found in an arthritic, gouty, neuropathic, syphilitic, rheumatic soil and, as a result, has to do with organs in a condition of diminished resistance; the less marked are the impressions of these predisposing causes the better are the results obtained in auditory reeducation.

The use of tobacco, quinin, alcohol, all chronic poisonings in general, influence unfavorably the value of the results; these ought to be treated with a course of active therapeutics.

So far as syphilis is concerned, it offers a perpetual menace of a complete apoplectiform deafness or at least of an intensification of the troubles of hearing in patients suffering from auricular sclerosis. When this is known to exist, we ought to always reserve a prognosis, immediate or remote, regarding hypoacousis, and warn the patient from possible loss, sudden or progressive, of the improvement obtained and of the uncertainty of the results.

The degree of improvement depends altogether upon the condition of the cardiovascular system. It is probable that the majority of ear affections have their point of departure in troubles of the circulation, local and general.

Blood stasis, lack of irrigation of the tissues of the ear, and endoperiarteritis of the vessels, are at the bottom of chronic infection of the auricular region, of atrophy of the labyrinth by hyponutrition, and of the degeneration, atrophic or interstitial, of the mucous membrane of the tympanum.

Circulatory disturbances favor the evolution of periostitis and the spongification of the capsule. The areas of osteitis, according to Otto Mayer, are of vascular origin and are the result of the nutrient vessels of the bony labyrinth, branches of the stylomastoid, governing the circulation of the cochlea and of the accessory canaliculi.

Electrophonoidal anacousia has, as is well known, an elective action upon the circulation of the ear which it affects. Its influence will always be profoundly favorable in all cases where the auditory tract is insufficiently vascularized—that is to say, in the majority of affections of the ear.

We would recall, in passing, that the vasomotor action of anacousis does not cease here, but that it seems to exercise an influence upon the general circulation. Helsmoortel of Antwerp, who has given especial attention to the question, states that regularization of the arterial tension and diminution of phenomena of hypertension and hypotension are the rule in the course of treatment.

(b) Conditions of Life.—The value of the results depends also upon the heredity of the deaf person, his age, profession, and his mode of living.

Hereditary deafness resists more than anything else treatment by anacousia, unless we can find a scientific reason for it, the more so as we do not know exactly the mechanism by which heredity acts upon the ear. So far as the age is concerned, it will suffice us to know that degree of improvement is inversely to the age of the deaf person, and to recall that in juvenile sclerosis it can be said that failure never takes place.

Profession plays a large rôle, not in the result which we can obtain, but in the maintenance of the result obtained. It is certain that we must not count upon lasting amelioration in a subject exposed, by his trade, to violent and continued noises, to chronic labyrinthine concussions (telephone operators, chauffeurs, artillerists), to differences in pressure of

great intensity (caisson workers, divers, aeronauts), to all inclemency of the air (hunters, fishermen, sailors, marines).

During the treatment we must insist in every case that the patient shall give up his work in order to avoid, at least for some days, these traumatisms to the ear, the result of occupation.

The maintenance of the result will rarely be obtained in deaf persons who are obliged to live on the sea shore. One can say without exaggeration that the sea is a personal enemy to the ear, especially in those who were not born there or who are not acclimated to the climate of the sea. We can attribute this unfavorable influence to the brusque changes of temperature, to the hygrometric condition of the highly charged air, to a chronic inflammation of all the mucous membranes of the rhinolaryngopharyngeal tract, the result of the cold, moist and irritant atmosphere.

II.—The value of the results obtained in anacousia depends upon the technic employed and the associated measures used.

Technic.—The technic of the electrophonoid method plays a capital rôle in the value of the results, and it is necessary to be acquainted with the modifications that must be made use of according to the case.

At the outset, in a general way it is preferable to give short treatments at frequent intervals, two or three times a day, of three minutes each are of more value than a single treatment of ten minutes. We must never forget that we are dealing with massage, gymnastics and sensory stimulation, and that, as in every other condition, frequent repetition of exercises has an action more intense and efficacious.

At the beginning of the treatment we must proceed with great circumspection, making use of a current of slight intensity. It should be the aim only to arrive at the very threshold of the dynamic phenomena—never to pass it. In other words, the labyrinth should not be irritated by an excessive sound. An exaggeration of the tinnitus and vertigo should be avoided.

In order to proceed with greater safety and prudence, it is desirable at the two or three first visits to treat only one ear at a time, in order to test the susceptibility of each.

It is not possible to determine this in a single day. It is a matter of tact, experience and especially of attention that one

acquires with time. The eyes and the mental reaction of the patient should always be noted and the expressions of his countenance. The least muscular contraction of his face is the first sign of danger.

We have seen persons treated at the outset with too great vigor who abandon their treatment because of the appearance of migraine or vertigo and of the increase of their head noises, and, what is still more serious, because for some days their hearing was made worse, an ensemble of symptoms which rapidly caused them to be discouraged. On the other hand, it is certain that, practiced with gentleness, electrophonoid anacousia will not produce symptoms of this kind. If it does not lead to a satisfactory result, it will at least in no case aggravate the condition.

But it is especially where chronic labyrinthitis exists, and in old people, that all precautions in technic are indispensable. If in spite of this we see a slight exaggeration of the troubles of equilibrium or of the subjective noises develop, it is imperative to stop all treatment at once.

In every case of labyrinthitis and whenever a patient complains of vertigo, high sounds are to be employed but with extreme gentleness. One ear only at a time is to be treated. On the contrary, when the middle ear only is involved, low and medium sounds ought to form the basis of anacousia reeducation.

The patient has also his responsibility in the matter, and he ought to collaborate conscientiously with the physician. Great perseverance and punctuality are required, and only rare absence from his daily exercises must be permitted of him. This has an especial bearing in men closely occupied and who respond with difficulty to this discipline. The authority of the physician is necessary to insist upon the importance, early and late, which there is on the part of the patient following out his treatment to the letter, and regarding his two seances each day as his first two obligations.

On the other hand, the rest of Sunday ought to be respected, and if it does not exist we must create it. We have often noted that Monday morning the improvement in hearing was much more in evidence, just as the amelioration is still better eight or ten days after the cessation of the exercises.

Toward the fifteenth day of treatment the patient passes the critical moment. He is accustomed to his initial improvement and, far from being contented, he wishes to hear as well as anybody else. Moreover, he finds this double treatment actually fascinating. This is because the moral cure is playing its rôle, and the aurist on this account ought with much emphasis to dwell upon these points, to stimulate any failing desire on the part of his patient, to make him comprehend the absolute necessity of persevering in the treatment which he has commenced. Indeed this is by means the least rôle of treatment by anacousia because, for the most part, deaf persons are on the road to neurasthenia and bear poorly their forced isolation. They are at a high point in their dislike of life and are prone to sadness, the sister of enforced solitude.

Associated Measures.—Voice is of first importance in reeducation. By the electrophonoid method the labyrinth becomes stimulated, the ossicular chain is passively vibrated; the circulation is rendered active, but the patient submits to these physiologic reactions. We compel him to hear. This is only a step on the road to improved hearing. The object to be attained remains. Making the patient hear is the chief part of anacousia, which alone deserves the name of reeducation, which altogether is as important as the first. The result obtained will be twenty-five per cent better if we submit the patient to these auditory gymnastics. If because of failure of time or faulty laryngeal conditions the physician cannot do this part of the treatment, he ought to give it over to one or more assistants or to the family of the patient, or finally to the patient himself, for this purpose using the wide tubes of Dr. Emile Tillot of Rouen.

We will leave for another occasion the detailed explanation of the technic of this reeducation by the voice. It is sufficient for the moment to say that it consists in repeating to the patient a series of isophonic words, existing or not existing, pronounced in a high voice and in a whispered voice, at a distance where the patient has a certain difficulty in perceiving them. This is done for about a quarter of an hour twice a day. One trains him also for a sensitive ear (if we may employ a classical expression, scientifically correct) to make his auditory organs of accommodation functionate, awakening

from their torpor these faculties of attention which for a long time have been growing numb by the habit of not paying attention to the conversation and so dwelling in perpetual silence.

This vocal reeducation calls for a great effort on the part of the patient, especially for the first few days. It causes intense fatigue, to such a degree that he always seeks to find a reason to avoid it. Here again it is necessary to assert authority, and at the end of a few days the perception becomes much easier; the dimness of sound which exists at the beginning gives place to a much greater clearness of tone.

Electric vibratory massage is another associated method of treatment of which I make frequent use where there are symptoms of stiffness of the ossicular chain, the result of a chronic arthritis or in the presence of bands of adhesions in the tympanum with retracted drum. This bony vibration is especially efficacious when seen in a deaf person with beginning signs of labyrinthism, intermittent vertigo, isochronous with the pulse, sensation of fullness throughout entire head tendency to congestion of the head, bone conduction equal or inferior to aerial conduction, etc.

There exists in each patient an "optimum" zone over the mastoid, where the application of the vibrating disc produces a concussion which is in every way pleasant, painless and at the same time awakens the contraction of the superficial muscles in that region, probably also the small muscles of the tympanum. Moreover, one can think of a congestion removing effect under the influence of this vibratory massage, and it is perhaps on this account that we frequently observe a marked cessation of the phenomena of labyrinthism.

I have made use also, with success, of the same procedure but applying it with a concave vibrating disc over the occiput.

These treatments ought not to last more than five or six minutes at the beginning, and it is preferable not to give them more than once a day. I commend for the auricular gymnastics the method of Fernet and diathermia.

It goes without saying that the physician making use of anacousia ought to procure for his patient all the improvement possible from the classical therapeutics in the course of the anacoustic exercises and ought not to omit in particular

inflation in hyperplastic adhesive otitis, interstitial sclerosis with thickening of the tympanum, stiffness of the chain, and especially in cases of tubal impermeability.

Otorhinopharyngeal hygiene ought to be rigidly insisted on. The auditory canal should be cleansed of all epidermal débris or cerumen which can be found there. The rhinopharynx ought to be perfectly clean and permeable. It is important for the patient to avoid all acute inflammations (coryza, angina, pharyngitis) during the period of his treatment, and with this in view to take every useful precaution.

I reach now, in conclusion, treatment of a general nature which ought to be the object of much solicitude on the part of the practitioner, because affections of the ear have a relation as cause or result with troubles existing in every other part of the organism. No one has failed to recognize that deafness is frequently found existing with gout, arteriosclerosis, rheumatism, arthritis. In our private practice we prescribe for the majority of our patients as rigid a vegetarian diet as possible and make use daily of purgatives with the idea of removing the toxins from the organism.

The function of the gastrointestinal canal, especially in women, should be carefully looked into, and chronic constipation ought to be actively combated. The lactic ferments, frequent purgatives, and massage of the abdomen form the best of these therapeutics.

In children suffering from juvenile sclerosis, we find often, as stated by P. Cornet of Chalons-sur-Marne, marked symptoms of autointoxication of the gastrointestinal canal, often causing congestion and sclerosis. It follows that calomel in small doses, repeated at considerable intervals, frequent purgatives, vegetarian diet, will aid greatly in the local treatment.

When we note symptoms of congestion of the ear, sensation of fullness, beating, intense noises and tendency to vertigo, headache with insomnia and neuropathic troubles we are in the habit of prescribing six pills of the following formula for six days, three series three times during the month: Extract of henbane, extract of valerian, oxid of zinc, aa 0.06; Indian hemp, 0.01.

In addition we order alcohol massage of the lower limbs, massage of the abdomen, strong purgatives, and especially we

complete locally this action by acupuncture of the mastoid or with leeches.

If we find a certain degree of hypertension, we place our patient on trinitrine, 2 dessert teaspoonfuls daily of the following solution: Alcoholic solution of trinitrin 1/100, L drops; distilled water, 300 cc., and later peptonated iodids, ten to twenty drops, before each meal, in a quarter of a glass of milk, regular gymnastics at home without tiring oneself; abdominal massage to reduce the congestion of the system, and rectal venous stasis to stimulate diuresis and to favor also a removal of the toxins from the system. We also favor a hypotensive action of the carbogaseous baths, such as they give at Royat, which reduce the pressure by producing an intense vasodilatation.

In order to obtain the greatest amount of improvement by auditory reeducation it is necessary to supplement this course of continuous treatment by an air or water cure—that is to say, by placing the patient under conditions of complete repose. To isolate him from his ordinary occupation and the fatigue of his profession is almost impossible of complete realization in the majority of cases. The ideal thing would be to establish sanatoria for the deaf out of the city, where the general health can be looked after at the same time as the local condition, and an efficient technic followed out—that is to say, give treatments, very short in duration, very gentle and more frequently repeated. This is a vision of the future. We must content ourselves for the present with making use of the physiotherapic action of electrophonoid anacousia in the best manner possible by adapting it with tact to each particular case and to supplement it by the additional means which are at our disposal. We must never forget that an intimate cooperation between a patient and physician is essential, that unfailing perseverance is bound to assist them, and that the value of the results depends not only on the direct or indirect action of the sonorous sound, but also on the will, the attention and the intelligence of the patient and the physician.

XX.

THE ROLE OF THE PSEUDODIPHTHERIA BACILLUS IN THE PATHOGENESIS OF EAR, NOSE AND THROAT DISEASES.

By Harvard McNaughgt, M. D.,

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There are many questions of interest yet to be settled in regard to the pseudodiphtheria bacillus and that large group morphologically similar, known as diphtheroids.

The writer cannot present any additional facts to those already known, but wishes to report some clinical observations which are at least suggestive. A brief review of the known facts may be permitted. In 1887 Löffler discovered an organism in a pseudomembrane of the throat which he termed the pseudodiphtheria bacillus. The year following, Hoffman and Wellenhof did some work on it, and it is commonly known as the Hoffman bacillus.

It was not, however, until 1904 that much information of scientific value was recorded. In that year Graham-Smith made extensive investigation regarding the bacteriology, and Hamilton the pathology, of the large diphtheroid group.

With all the work done, however, there remain two important points to be yet determined, namely, the pathogenicity or otherwsie of the organism; secondly, the question of whether it is a separate entity or an altered Klebs-Löffler bacillus.

Let us first glance at the main characteristics of the pseudodiphtheria bacillus, remembering that Hamilton investigated twenty-nine organisms, twenty-six of which were true diphtheroids.

Morphology.—It differs from true Klebs-Löffler in being shorter, stouter, straight, usually slightly clubbed. Usually stains intensely. It commonly shows but one unstained transverse band. When longer it may show two transverse bands,

and when short it may resemble cocci. It never has flagellæ or spores.

Staining.—It most often stains intensely and in a more uniform way than diphtheria bacillus. If colored by Roux's method or Neisser's, no metachromic end bodies can be defined.

Cultivation.—It grows more luxuriantly upon ordinary culture media than the diphtheria bacillus with larger colonies, less transparent and whiter when seen upon agar-agar. In bouillon, there is more marked clouding and less marked pellicle formation. On Löffler's blood serum, it is too much like true diphtheria bacillus to be differentiated.

Chemistry.—The most essential points are, first, that the organism cannot be made to produce a soluble toxin, though the socalled virulent forms of Reudiger, Rosenow and others produce an antiserum specific for themselves; that they are able to ferment dextrose, saccharose and maltose while the true diphtheria bacillus ferments dextrose, dextrine and maltose but not saccharose. They are nearly all nonpathogenic for guinea pigs.

Distribution in the Body.—The diphtheroids are found on most surfaces of the body at some time or other, and have been recovered from normal tissues, such as lymph glands, cerebrospinal fluid, etc. This fact has been used as an argument by some of the nonpathogenicity of the organism, but that cannot be true any more than it can of the streptococcus or pneumococcus which is also commonly found. The pseudodiphtheria bacillus is frequently found without pathologic change in the nose, throat and external ear. Neumann found the organism in 100 per cent of normal noses, where it is called the bacterium coryzæ segmentosis. This organism is said to be of importance in common colds. Neufeld has encountered rods mildly pathogenic for guinea pigs in ozena. He considers them irritative but not a causative factor. Bergey states that the pseudodiphtheria bacillus forms are more important in continuing an inflammation than inciting it. Graham-Smith reports the organism as common in normal ears and in ears in scarlatina, and described two varieties which he considers normal in external ears.

Pathogenicity.—Very few reports of fatal guinea pig inoculation. The principal lesion is slightly indurated infiltration at site of inoculation. Hamilton reports a number of cases of otitis media chronica purulenta and otitis media purulenta acuta, due to this organism. One case had a streptococcus infection in the glands at the same time and showed two opsonic curves. These curves varied as vaccines were used; the pus formation and the pseudodiphtheria index were improved by vaccine of the pseudodiphtheria bacillus only.

Beyer reports a tracheitis and cases of pharyngitis due to these organisms. Cave, Hewlet, Priestly, Richmond, Knight and others believe that a mild, frequently unilateral tonsillitis may be caused by the virulent forms.

In some recent work done by Petri it was found that horses immunized with large quantities of filtrates of bacillus Hoffman would not produce any antitoxin to diphtheria toxin. This will explain possibly the failure of some supposed diphtheria cases to improve under antitoxin. The organism has produced a bacteremia and endocarditis.

Many well authenticated cases of disease in other parts of the body have been recorded, though in the majority of cases as in the cases to be quoted, there was lacking proper pathologic evidence. It is mainly to bring this to the attention of men in our specialty that I have submitted the foregoing review and the cases of my own which follow:

Case 1.—Alex. W., Finn, age forty years. Admitted to Stanford University Clinic November 1, 1912, suffering from otitis media purulenta acuta. Previous history negative. Present illness: Two weeks before admission had a sore throat on right side only; two days after, right ear began to ache. Next day it began to discharge but did not stop aching.

Status Praesens.—Mastoid swollen, red, tender on deep pressure over antrum and emissary. Membrana tympani: Left, normal, right bulging, red, small perforation below hammer, in which pulsating pus was seen. Weber to the right, Schwabach. Right, lengthened; left, normal. The nose showed slightly hypertrophied inferior turbinates and septum deviated to the right. Nasopharynx normal; tonsils medium, right markedly hyperemic. Temperature, 100°.

Treatment.—Paracentesis done, a free flow of pus ensued which was of a chalky whiteness, different from any other I had ever seen. The mastoid swelling and tenderness did not improve, and a simple mastoid operation was done. The destructive process was extensive. The patient made an uneventful recovery. Cultures of the pus from paracentesis and from the mastoid wound were reported as morphologically and in staining and cultural peculiarities to be undoubtedly pseudodiphtheria bacillus. Later cultures showed many pseudodiphtheria bacilli, but chiefly pus cells and a few pneumococci. In this case the unilateral tonsillitis, color of pus, morphology and cultural peculiarities would seem to place this case among those due to pseudodiphtheria bacillus.

Case 2.—Lucille S., female, age twelve years; seen in private practice. Complaint: Discharging right ear. Past history negative except for exanthemata. Tonsils and adenoids had been well removed some years ago. Had an earache when six years old, followed by discharge from ear, and this has continued intermittently to present time. Right membrana tympani gone, very few granulations in tympanum; small polyp from posteriosuperior wall of tympanum. There was a small amount of chalky white pus in the tympanic cavity. This was first reported diphtheria bacilli in pure culture. Second examination and plating with guinea pig inoculation led to the report of pseudodiphtheria bacillus. Two other laboratories reported pseudodiphtheria bacilli from morphology and cultural peculiarities. Treatment: No vaccines were used; washes and lactic acid were used without influencing the condition. I have lately given the patient autogenous vaccine, and there is some improvement in the discharge, though more time is required for observation.

Case 3.—Fred F., Italian, age twenty-six years, admitted to Stanford University Clinic, complaining of hoarseness of many years' duration. No cause was found in nose, nasopharynx or pharynx for this. Larynx: There was a thickening, almost prolapse, of the false cords. True cords normal in action, pink; arytenoids thickened and dusky red. There was always some thick mucopus around the cords at each examination. Bronchoscopic examination was negative; Wassermann, negative. In spite of this, the patient was put on

mixed treatment and became nearly salivated without influencing the condition. A section was taken from false cord and examined for Frisch bacilli and Mikulicz cells, but none was found, thus excluding rhinoscleroma. Cultures were made from the larynx on two different occasions and pseudodiphtheria bacilli reported.

Case 4.—Anna B., age nine years. Patient of Dr. Black of Palo Alto. Complained of hoarseness for some years. My examination showed a web between the cords at the anterior commissure. This case was subsequently operated by Dr. H. B. Graham, who reports that the web was simply removed under suspension laryngoscopy. Immediately following, a membrane developed at site of operation, and a culture was reported diphtheria bacilli. Subsequently this report was changed to pseudodiphtheria bacilli on the morphology and avirulence to guinea pigs. This and the preceding case seem to show the tendency to slow new tissue formation and infiltration mentioned by a number of investigators.

SUMMARY.

1. The pseudodiphtheria organisms occur normally on many surfaces and in many tissues of the body. It is probable that under normal conditions even the socalled virulent types are nonpathogenic, but may become so by symbiosis or a depressed general or local state.

2. The organism, so far as is known, is not a mutation form of the Klebs-Löffler bacillus, though at times resembling it in its morphology. Its behavior in culture towards sugars and the fact that it has its own opsonic index are additional proofs of its distinctiveness.

3. Negative results from guinea pig inoculations are not conclusive proof that it is a pseudodiphtheria bacillus, as avirulent Klebs-Löffler bacilli may give the same result.

4. In true infections with this organism agglutinin is formed and the serum opsonin is decreased. A mild bactericidal power of serum arises in patients, and a very pronounced bacteriolysin can be produced in experimental animals.

In conclusion, I cannot do better than quote the words of Fox, with whom I heartily concur, regarding this organism. He says: "It seems to the writer that in view of the well known difficulty in determining the exact relation of the

pseudodiphtheria forms to the diphtheria bacillus and the diseases it causes, it is only fair to demand that some of the immunity tests be presented. It is not to be expected that the organisms shall be isolated on every occasion and from every lesion in perfectly pure culture, but it can be required that the organism shall predominate and that the blood shall show some immunity reaction. By immunity tests and the sugar reactions I believe that we can separate the avirulent diphtheria bacillus, the pseudodiphtheria bacillus and the bacillus of Hoffman."

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XXI.

THE ASSOCIATION OF OCULAR AND NASAL ACCESSORY SINUS DISEASE.*

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It will be conceded readily that the careful study of the ocular symptomatology, either associated with or directly caused by disease of the sinuses accessory to the nose, constitutes the focal point to which converge two important specialties.

To the ophthalmologist the early recognition of this association is always an important matter, and his failure may be an exceedingly grave one.

It has long been recognized that the etiology of the often complex symptomatology of this anatomic and clinical borderland may require for its elucidation the cooperation of the internist, the laboratory and X-ray experts, in association with the rhinologist and ophthalmic surgeon.

Some of the ophthalmologists present will recall the discussion precipitated some ten years ago by Dr. Posey in a paper before the American Ophthalmological Society upon the position of the ophthalmologist in the treatment of nasal sinus disease, the plea being made for a more accurate appreciation and study of the relationship obtaining between these ocular and nasal structures.

In his discussion of Posey's paper, the late Dr. Gruening of distinguished, if somewhat bellicose memory, replied, "The ophthalmologists do pay attention to these conditions, and the ophthalmologist must be a rhinologist; that is understood, and there can be no doubt about it."

The enormous development of each of our specialties during the last ten years may well make us question this dictum of Teutonic finality.

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It was Arthur Christopher Benson who said of the specialist that he was harmless and necessary, so long as he was aware of his limitations.

The ophthalmologist who has the temerity to attempt an entrance into the field that you so preeminently command, if he has had sufficient training to make him conversant with these associated conditions, may intelligently examine and conservatively treat them, but must be prepared to ask the assistance, at the proper time, of his rhinologic confreres in the performance of the necessary operations upon the contiguous sinuses.

Let us try to disassociate our study from the stigma of undue magnification of the cause of the ocular symptomatology as necessarily resident in the sinuses, even though disease of both structures exists.

In the development of this thought it behooves us, likewise, to be constantly on guard to recognize the constitutional factors that may be inducing a toxemia of each of these contiguous structures at one and the same time, the proper treatment and removal of which may cause prompt amelioration and cure of the ocular and nasal conditions, without the need of other than the mildest local treatment.

The narrow viewpoint of the specialist was recently illustrated while discussing, with a distinguished professor of operative dentistry, the association of maxillary sinuitis with diseased teeth conditions, he stoutly maintaining that every such case was due to the teeth, and I think accepted, with considerable qualification, the writer's definite statement that about seventy-five per cent of such conditions were entirely disassociated with any dental disease.

Since the subject of accessory sinus disease, from the rhinologic standpoint, was so admirably reviewed in a recent symposium before the members of this section, participated in by such authorities as Skillern, Grayson, Van Sant, Coates, Gleason, Wood, Eves and others, it is my purpose to approach it in the main from the ocular viewpoint.

The rhinologist will unquestionably maintain that many cases of sinuitis are entirely minus any ocular signs, and indeed most of us will agree with so careful an observer as Jessup of London, when he suggests that, at times, there are

no characteristic visual changes associating these two contiguous structures.

Bryan of Washington believes that the majority of all the severe inflammations of the accessory sinuses are accompanied with more or less disturbance of the eyes, the variations being, as a rule, governed by the severity of the sinus disease, and that they are not discovered early because not adequately sought until ocular symptoms develop.

T. E. Brawley of Chicago (*Journal American Medical Association*, March 23, 1907, "The Relation of Diseases of Accessory Nasal Sinuses to Diseases of the Eye"), a painstaking observer and student of these associated conditions, maintained, as early as 1907, that every case of intraocular disease should be accompanied by a careful study of these contiguous cavities. Even a partial review of the literature will make most of us willing to assume the advanced position recorded by the late lamented Reber, that all manner of extra- and intraocular disease is, at times, traceable to nonsuppurative and suppurative pathologic processes in these contiguous nasal sinuses, and will certainly justify the observation that in all ocular diseases of obscure origin, the sinuses should be studied, and if ocular signs justify it, treatment of the suspected sinuses is indicated, even in spite of negative rhinologic report.

It is a fact that the careful special testing of visual function and the finding of certain changes in the visual field may establish a diagnosis before nasal symptoms have been sufficiently marked to attract attention, and further, it is not infrequent for closed empyemas and mucoceles to give a false sense of security by an almost total absence of nasal symptoms, notwithstanding the presence of ocular change.

It is quite impossible, in a comparatively brief consideration of the subject, to refer adequately to a very extensive literature which has accumulated during the last ten years, much of which may be classed as intensive and epoch making.

Onodi, as is perfectly well known, has given special impetus to the whole subject we are considering by his contributions, which include a study of the oculoorbital, intracranial and cerebral complications as well as by his published anatomic

studies of the relations of the posterior sinuses to the normal and anomalous proximity to the optic nerve.

The anatomic studies of H. W. Loeb (ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY, June, 1909) likewise furnish illuminating data regarding the relation of the posterior sinuses to the nerve and chiasm, this distinguished writer having advised us that more than half of the nerve was included in the sinus portion.

The important relationship between the orbits and the sinuses, in the anterior segment of the skull, was the subject of an important communication by Dr. Samuel D. Risley, before the International Congress at Edinburgh in 1894, concerning abnormalities of ocular balance; it being even then recognized that departures from the normal contour in sinus development furnished a strong predisposing cause of interference with sinus drainage.

The strategic position occupied by these nasal sinuses with reference to orbital attack, by way of the roof, floor and inner wall, through the actual giving way of these thin, bony and mucoperiosteal partitions (and, indeed, in the case of the ethmoids, the existence of socalled dehiscences mark the absence of any but the latter protection), makes the direct extension by pressure, erosion and necrosis, or through the interstices, readily understood. Adhesions may occur between the orbital periosteum and the optic nerve sheath, and these adhesions may be vascularized, offering a direct route for ocular infection (Brawley).

It is quite unnecessary in this presence to trace the ophthalmic artery in its ramification from the orbit into the ethmoid and frontal cells, nor the return journey of the ethmoidal veins into their ophthalmic reservoir.

Again, the intimate association of the ciliary system need scarcely be urged as pointing to the ease with which a toxemia may reach the eyes. With the rôle played by the fifth cranial nerve in ophthalmic, sinus and intracranial disease you are also entirely conversant.

The rôle of the lymphatics and the lymphatic sheaths of the nerves should be given emphasis in tracing the likely routes of infection.

Regarding the latter method of transfer, it is claimed by Miodowski, as the result of his work in the clinic of Professor Brieger of Breslau (quoted by Freudenthal), that, by reason of their anatomic features, they should be and, he believes are, the best reservoirs of all invading bacteria.

It would be very desirable, if it were possible, to separate the ocular symptoms induced by sinus disease into two definite groupings, the anterior and posterior.

The anatomic association, already referred to, as well as the numerous clinical reports at our service, will serve to indicate the impossibiltiy of any such dogmatic differentiation.

The routes of ocular involvement, secondary to rhinogenous disease, will be then—

1. By continuity.
2. By way of the blood vessels.
3. By way of the lymphatics.
4. By way of the lymphatic sheaths of the nerves.

Ocular symptoms, the result of abnormalities in the nasal mucosa, have long been an established fact, entirely apart from the presence of pus producing organisms. Differences in the power of accommodation in the two eyes have frequently been relieved, as recorded by such authorities as Ballenger, Stucky, Pynchon and others, by the removal of nasal pressure in a partial excision of a hypertrophied middle turbinal. The disappearance of blepharospasm by the same procedure is a likewise generally recognized observation. Lacrimal disease from epiphora to blenorrhea may easily be associated with mechanical obstruction of the nasal end of the duct. Indeed the vicious rôle played by the duct, in the transfer of infection to the cornea, is a generally conceded possibility, S. Lewis Ziegler, for example, claiming that upwards of 90 per cent of corneal ulcers are due to nasal conditions.

Blepharospasm, dacryocystitis, photophobia, epiphora, ocular pain and reflex ocular disturbance, expressing itself in so-called asthenopia, have many times found a causative factor in nasal congestion, spurs, tumors, ulceration, hypertrophied or polypoid turbinal degeneration and from contraction from nasal synechia caused by the too vigorous use of the cautery. W. C. Parker, in a review of these associated conditions, believes 50 per cent of them are caused by nasal disease.

Ziem and Kuhnt have traced iritis and cyclitis to a nasal origin. Parker has found improvement in refractive defects to follow the lessening of ciliary irritation and congestion by nasal treatment, and few oculists today attempt to treat phlyctenular disease of the conjunctiva or cornea without taking into account the condition of the nose, the tonsils and the adenoids.

Stauffer of Salt Lake City has noted deep ciliary injection to be present in nearly all high deflections with pressure on the middle turbinal.

A number of writers, among them Griffin and Haskell, have recorded observations pointing to the vascular or reflex connection between nasal hypertrophies and glaucoma, the latter disease being greatly relieved by the removal of the thickened vascular structure.

Middle turbinal pressure may be either against the septum or antral wall, and a number of well known authorities insist that if pressure prevents free ventilation and drainage, the turbinal should be removed, even though it presents no pathologic changes, as the negative pressure thus induced within the ethmoid or frontal will eventually lead to pain, pus formation and ocular disturbance.

If the conditions briefly outlined are productive of evident ocular symptoms, it is surely not a far cry to the more profound lesions that may easily accompany the deeper sinus congestions, mucoceles or empyemas.

The sinus involvement may run the gamut from a simple hyperemia to catarrhal inflammation, suppuration and necrosis, and each form may, and frequently is, accompanied by ocular symptoms.

Perhaps the simplest form of ocular discomfort which is apt to succeed a congestion of the nasal mucosa, with obstruction of the normal sinus outlets, as pointed out by Parsons (*Journal-Lancet,* 1913, page 332), is a unilateral headache with pain and some tenderness at the upper, inner orbital angle, aggravated by stooping, with or without some vertigenous sensation, congestion of the conjunctiva of the lid and eyeball, with lacrimation, muscular twitching and discomfort upon attempting to use the eyes for near work. The latter symptom will probably draw attention to a refractive defect, which

in itself may be an entirely minor element in the causation of the condition.

The vicious circle thus set into action, with the induction of socalled negative pressure within the sinuses, is a common observation. Middle turbinal pressure against the septum may be the contributive cause, and here recurrences may make it necessary to excise it in part.

As a rule the acute cases of sinus disease are not seen by the ophthalmic surgeon, as the family physician and nasal specialist are those consulted during the earlier manifestations, and unless the infection is an especially virulent one, causing external violent ocular symptoms, the opportunity to examine such expressions of disease is only afforded well on in the subacute or chronic stages.

The usual types of eye involvement in acute and chronic sinus disease are those with external manifestations such as edema, cellulitis, abscess; those without external signs but manifesting definite lesions of the ocular fundus; those with corneal, iritic, ciliary or general uveal inflammation and even glaucoma; those exhibiting the pressure signs of mucoceles; and finally the unilateral pain and headache due to rarefaction of air in frontal or ethmoid which often expresses itself as violent asthenopia with or without definite pupillary, paretic or paralytic muscle phenomena.

SYMPTOMS.

The ocular symptoms of sinus disease, to which I will first direct your attention, is edema of the eyelids, on one or both sides, usually unilateral. Gerber claims it to be a very early symptom of orbital involvement. It may be present for prolonged periods, at times being typically fugitive and recurrent, varying from a slight flushing to a marked swelling of red or brawny type. Dr. de Schweinitz in 1910 (American Ophthalmological Society) emphasized these fugacious appearances as pointing just as definitely to sinus disease as the common edema more generally present. They are usually accompanied with unilateral pain, supraorbital neuralgia and frequently with burning on the affected side of the face, and can be an expression of disease in any one of the four sinuses, but are thought to be conspicuously evident in acute ethmoiditis and

frontal sinuitis. Edema tends to lessen as drainage is established, and if due to either of the latter sinuses is apt to be less in evidence at night and more in the morning. There is no doubt, however, that even a casual review of the literature will definitely place the maxillary sinus in the rôle of causation. Onodi, Digiuseppie, Di Tito, Rollet, Genet, Freeman of this city and others have reported cases. In Freeman's case it was caused by only a few drops of pus in the sinus. If due to disease of the maxillary antrum the edema should be more marked during the day, if the patient is in an upright position.

This symptom must be distinguished from that caused by incipient hordeolum, as well as from the edema of an acute dacryocystitis, that from lid furuncle, or from the deep infiltration that precedes an abscess of the lids.

The edema accompanying periostitis of the orbital margin can, as a rule, be diagnosticated by the hard character of the underlying swelling.

In erysipelas the swelling and redness are uniform, the skin feels thicker and harder, and circumscribed infiltration is absent. The swelling occupies both, as a rule, and usually extends to the neighboring parts. The recurring angeioneurotic edemas allied to urticaria, and often associated with disturbances of the menstrual period, must be considered as well as those symptomatic of migraine. The edema accompanying acute eczema is also worthy of note.

Consideration of the noninflammatory lid edemas, associated with cardiac disease and nephritis, often appearing under the guise of edema fugax, must also be differentiated.

The edema of acute blenorrhea and diphtheria of the conjunctiva, iridocyclitis, uveitis and glaucoma are, as a rule, readily eliminated. The edema of a retrobulbar phlegmon or that expressive of a severe orbital cellulitis or abscess secondary to frontal or ethmoidal empyema must be, if possible, differentiated from the early orbital manifestation of thrombosis of the cavernous sinus. In thrombosis the lid and conjunctival swelling are marked, the eyeball is protruded and moves with difficulty. The retinal veins are enormously dilated, and there is apt to be a doughy edema in the mastoid region. In sinus thrombosis the edema and swelling are frequently bilateral, and this is rare in sinus disease. Thrombosis is apt very

promptly to lead to cerebral symptoms and a fatal issue. On the other hand, suppuration in the posterior ethmoid cells and maxillary antrum may, according to Fuchs, lead to sinus thrombosis, hence it will be readily understood how difficult at times absolutely accurate differential diagnosis becomes.

Our edema study can easily become more complex by the development of a meningitis, in association with oculoorbital disease of rhinogenous origin, and in this connection has been exhaustively studied by P. H. Gerber (Komplikationen der Stirnhöhlentzundungen, 1909), with an analysis of fifty-one cases from literature, as well as by Onodi, in his well known work (Pathologie and Therapie der Nasenkrankheiten, 1910).

To these have recently been added two cases by Dr. Samuel Leopold of our city, one with oculoorbital symptoms and a second with rapid brain involvement from influenza without demonstrable ocular signs, the first illustrating an intermittent frontal sinuitis with a final meningitic attack, and the second quickly terminating in a sudden apoplectiform attack. A third slow, insidious, protracted form is distinguished. When ocular complications are present we may have disease of the inferior sinus wall or orbital roof. Thrombophlebitis may indirectly produce leptomeningitis. Here again Leopold believes the lymph channels may also play an important rôle.

In both tenonitis and orbital cellulitis, secondary to sinus disease, edema of the lid and conjunctiva and proptosis of the eyeball are present. Again, according to Fuchs, if the chemosis is pronounced and the proptosis slight, tenonitis is probably in evidence. The opposite condition of affairs points to the deeper involvement.

Dr. Posey refers to a collateral inflammatory edema of the upper lids and orbit accompanying a periostitis in the presence of acute frontal and ethmoidal sinuitis, in which an exploratory puncture showed the presence of pus, under the periosteum, but to which an incision gave no added purulent matter.

Actual blackening of the lids at times occurs, suggestive of an ecchymosis, and this as the edema may be also recurrent. The value of this symptom was emphasized by de Schweinitz in his paper, "Some Observations of the Ocular Manifestations of Sinus Disease," before the American Ophthalmological Society, in 1910, and again in discussing Dr. Bryan's

paper before the College of Physicians. The appearance and disappearance of these lid manifestations are obviously dependent upon relief from an obstruction to drainage in frontal, ethmoidal and antral empyema.

Congestion of the conjunctiva and lacrimation are very frequently present, the former extending at times to a definite conjunctival catarrh.

Emphasis must also be placed upon the presence of a fugitive episcleral congestion, resembling the episcleritis periodica fugax of Fuchs, or the Hutchinson "hot eye."

The dilated and tortuous episcleral vessels are deeper in hue than those of ordinary episcleritis, are said not to bleach under adrenalin, and are apt to be accompanied with very violent headache. These attacks may last for weeks, as in a case reported by de Schweinitz, before the cause is suspected.

To these may be added curious corneal phenomena mentioned by the same writer, namely, edema of the corneal epithelium, resembling that induced by cocain or a socalled wrinkling of the cornea. Posey and Gerber have seen herpetic eruptions associated with sinus disease.

Of the inflammatory ocular conditions, as is well known by every ophthalmic surgeon, none is at times more baffling than uveitis and iridocyclitis. One of the earliest reports associating this condition with sinus disease was by Dr. Posey in 1897, November 16, before the Ophthalmologic Section of the College, where the eyes of a laundry worker became blind and the ball shrunken from a violent uveitis, the nasal and sinus condition being due to inhalation of acid fumes. The involvement of the cornea, iris, ciliary body and choroid, constituting this well known uveal picture, may have a very varied etiology, such, for example, as syphilis, tuberculosis, entergenous intoxication of intestinal origin, gonorrhea and the toxic products from a diseased tooth, mouth, tonsil, skin, uterine cavity or accessory sinus, and it is perfectly possible that two of these sources of infection may be present at the same time, but since Ziem, Ebersbush (quoted by Brawley), and many other observers have associated these conditions with sinus disease, no study is complete that lacks sinus consideration.

Disease and abscess formation in the region of the lacrimal sac, giving the symptoms strongly suggestive of lacrimal mucocele, may be the socalled prelacrimal abscess and have their origin in the lacrimoethmoidal cells.

Alterations in refraction, the result of pressure from a dilated sinus is not an infrequently recorded observation and ciliary spasm and congestion, the outcome of nervous and lymphatic influences, may likewise contribute to the production of this phenomenon. Stewart of Portland (Ophthalmic Record, 1910) has seen three-fourths of a diopter against the rule disappear, after surgical treatment of a sinus.

I am entirely in accord with the view that these, and many others of the associated ocular and nasal conditions of indeterminate origin, but with at least a relaxed turgescence or socalled vasomotor hypertrophy may and should be relieved by general upbuilding, with iron for example, as suggested by MacWhinnie, or other tonics and supplemented by exercise, a change of climate, intestinal antiseptics and laxatives with appropriate local nasal treatment, with which you are all familiar, before operation is undertaken.

INFLAMMATORY ORBITAL SYMPTOMS.

Inflammatory conditions of the orbit are present in and the result of nasal sinus disease in 60 per cent of the cases according to Birch-Hirschfeld, of Leipsic, and indeed other authorities assign an even more important role to them in the induction of orbital cellulitis: Posey, for example, maintains that fully nine-tenths of all cases of cellulitis are secondary to sinus affections, and St. Clair Thompson (London *Ophthalmoscope*, 1908, "The Frequency of Orbital Manifestation of Nasal Sinusitis"), believes we should cease to regard orbital cellulitis as primary and should look to the nose and accessory sinuses for the infection. The inflammation often persists, notwithstanding the establishment of drainage by reason of the orbit being a closed cavity. The acute or chronic purulent sinuitis was due in Hirschfeld's cases to rhinitis, influenza, pneumonia, scarlet fever, diphtheria or traumatism.

The more frequent route of orbital infection from accessory sinus inflammation is by way of the floor of the frontal, the os planum of the ethmoid and the roof in the maxillary

sinus, the symptoms varying as the condition is acute or chronic. In the acute variety the eyeball is tender, there is usually pain upon rotation, a socalled orbital neuralgia especially upon concentrating the gaze, and tumefaction at the upper inner or inner angle involving the inner third or half of the eyelids.

If the fundus can be seen the veins will be full, the edges of the disc veiled, the surface of the nerve too red, or edematous with confusion of sight, diplopia, edema of lids, conjunctival chemosis, periorbital pain increased upon pressure, dimness of vision and a varying proptosis of eyeball depending somewhat upon the primary source of the swelling, being forward, downward and outward in front sinuitis, with limitation of upward and inward movement, more nearly directly forward in sphenoid disease, and forward, downward and inward (Skillern) in ethmoiditis.

The completion of the symptom complex will be dependent upon the degree of cellulitis and its extension into an orbital abscess.

The rapidity with which an orbital cellulitis secondary to an acute ethmoiditis may proceed to a fatal issue is illustrated in the case of Clegg, in which a girl of nineteen previously perfectly well, developed sudden headache and vomiting with great edema of the lids and reduction of vision to light perception. Temperature and pulse were normal. Drainage of orbit brought temporary relief, but death ensued in four days.

Hilfrich, K. J., in a paper upon "Intraorbital Complications in Acute and Chronic Accessory Sinus Disease," *Zeitschrift fur Ohrenkrankheiten*, page 31, emphasizes the fact that swelling of the contents of the orbit causing protrusion, limitation of movement of the eyeball, diplopia and headache, marking the acute onset of exophthalmos, may be at times the only external sign of accessory sinus disease.

Mucoceles from the frontal and ethmoid are apt to be marked by the presence of a quiet tumor at the upper and inner or inner aspect of the orbit, dependent upon the involved sinus without active inflammatory symptoms causing displacement of the orbital contents with resulting exophthalmos down and out. This may be combined with polypoid formation and evident ethmoid disease or as in a case of Reber's

can exist with an entirely negative rhinogenous finding. In the latter case a spray of antipyrin, cocain and adrenalin several times a day for about ten days suddenly resulted in a gush of thick jellylike fluid from her throat, causing a complete disappearance of all the symptoms.

These mucoceles may result in a periostitis of the frontal floor or over the os planum. A subperiosteal abscess may result and may either be encapsulated or penetrate the skin of the lid.

Axenfeld maintains that the distinction between osteoma and mucoceles, many of the symptoms of which are allied, may be made by the X-ray.

The enlargement caused by mucoceles is often of almost bony hardness suggesting an exostosis. A tense parchment like appearance is apt to be followed by crepitation or fluctuation.

The slow growth permits an ocular adjustment, therefore there is frequently no diplopia and the failure of the optic nerve to show any radical departure from normal is explained by its straightening at the sigmoid flexure without pronounced stretching (Posey).

Gummata of the upper inner angle of the orbit may present symptoms closely similating mucocele distension as in a case of Zentmayer's and a second of F. C. Parker, and here when doubt exists as to each diagnosis the modern syphilis tests are invaluable.

The ocular changes secondary to sinus disease appear usually in adult life, but a number of well recorded cases appear in infancy and early childhood.

Drs. Frederick Krauss and William Campbell Posey of this city, for example, have reported cases of orbital abscess secondary to maxillary sinuitis. In Dr. Krauss' case the disease appeared at four months and in Posey's between one and three years. Posey had originally regarded them as osteomalacial in origin.

'Onodi records the size of the maxillary sinus at one year of age as 5 by 3 millimeters up to 19 by 8 millimeters in size, and in fetus of six and one-half months the same author found a maxillary sinus 3 by 1.5 millimeters.

OCULAR MUSCLE INVOLVEMENT.

This aspect of the subject has been carefully elaborated by Savineau, Peyser, Galezowski, Bernheim, Posey, Reber and others.

Interference with the mobility of the eye usually results from mechanical displacement associated with a distended sinus wall or from the presence of exudation, yet asthenopia, paretic or paralytic conditions of the ocular muscles do occur in sinuitis entirely apart from such displacements and occasionally may be an accompaniment of even a mild sinus involvement. These later cases, as Bernheim and Skillern suggest, are apt to be the result of the selective action of a toxin just as is true of the infectious diseases, autointoxication and influenza.

The anatomic relations will readily point to the frontal cells as responsible for involvement of the superior rectus, superior oblique and the levator, and Savineau has associated the internus and accommodative muscle involvement with frontal disease, although the lack of power in the interni usually points to ethmoidal diseases and that of the inferior rectus and inferior oblique are most apt to indicate antral disturbance.

The intimate association of the nerves which supply the ocular muscles with the outer wall of the sphenoid will readily explain in part the muscle disturbance, and disease of the sphenoid is regarded by some authorities as the most frequent cause of muscle involvement of sinus origin. The ethmoid frontal and antrum probably offend in the order mentioned.

In acute cases pareses or paralyses are occasioned by direct inflammatory infiltration of the long flat belly of the muscles themselves as they lie close to the sinus walls or by involvement of the nerves as they enter the orbit.

In many instances diplopia is not complained of, but is detected by the red glass and a search in the peripheral field. Diagnostic help is gained by noting the pain when the eye is turned in the position that calls forth the greatest movement of the affected muscle.

The use of the eyes is difficult and painful, confusion of vision, vertigo and reflex gastric disturbance are frequently present.

Alternate dilatation and contraction of the pupil is reported by McBean of Chicago in a paper upon variations in the sphenoid sinus (ANNALS OF OTOLOGY, LARYNGOLOGY AND RHINOLOGY, 1914) and two cases of pupillary dilatation in sphenoid disease are reported by Sluder.

The condition was one of acute sphenoiditis in McBean's case, with pain back of eye and in occiput with severe asthenopia. In a few days wide dilatation of pupil was followed by myosis, with spasm of accommodation. All local medication was resisted and the case cured by an autogenous vaccine. McBean regards the explanation of the phenomena as an irritation of the carotid plexus of the sympathetic producing mydriasis, and considers that later motor oculi irritation produced myosis.

Baumgarten and Lapersonne are quoted by Onodi as also having seen oculmotor paresis and paralysis from sphenoidal disease.

The picture of complete palsy of the levator palpebrarum (right) frontal sinus empyema is apt to include severe neuralgic pain in the supraorbital and frontal region with marked tenderness upon tapping. In one case reported by Posey the globe movements were unrestricted. Conservative treatment to the frontal sinus by Dr. George B. Wood in this instance caused a rapid improvement. The close apposition of the muscle to the sinus floor and the absence of sphenoid and ethmoid disease established a diagnosis of direct involvement.

It is not always easy to differentiate between edema and paralytic ptosis, each at times being fugacious and recurrent.

In the more chronic types of sinuitis the disturbance of the eyeball is slow because the sinus distension is very gradual and the muscles adjust themselves to varying conditions.

The socalled rheumatic ocular palsies are thought by a number of authorities to be more often due to sinus disease.

It is perfectly well known that many of these ocular palsies are due to specific disease and every oculist of experience has seen cures result from large doses of the iodids, but if the possibility of sinus origin be kept in mind we will frequently produce a rapid cure by the sinus route.

OCULAR FUNDUS CHANGES UNACCOMPANIED BY EXTERNAL INFLAMMATION.

An exhaustive ophthalmoscopic and perimetric examination becomes of especial importance in those cases of sinuitis in which changes in the fundus oculi are present without any external signs of orbital or ocular inflammation. These changes may be retrobulbar neuritis—a papilloedema or choked disc, an optic neuritis—neuroretinitis, thrombosis or phlebitis (de Schweinitz), retinal detachment and finally definite blind or blurred areas in the visual field without ophthalmoscopic evidence of ocular disease.

The areas of greatest significance in the study of intra-ocular disturbances are two in number, first the macula with its acute recognition of white and color, and second the optic nerve at its point of entrance into the eyeball, the latter being the socalled "silent" area or the blind spot of Marriot.

The presence of symptoms of optic nerve involvement (as emphasized strongly by distinguished authorities) are the most dangerous of the sinus pointings and if not relieved by suitable drainage may be followed by atrophy. If these changes are unilateral they especially call for sinus study.

The importance of repeated field examination in arriving at a more definite diagnosis is emphasized by such a case as reported by Heed, where a female of thirty-nine complained of blurred vision and vertigo and in which a fundus examination showed only a suspicious hyperemia of the disc but with normal fields. Five days later an active neuritis with contracted fields existed. Treatment to ethmoid cells caused a rapid cure.

The presence of a central scotoma in the absence of any demonstrable ocular involvement in the media, retina or choroid points definitely to a macular lesion and is pathognomonic of an axial orbital or retrobulbar neuritis, which is ordinarily caused by the circulation of an infecting agent in the blood, this toxemia inducing an interstitial inflammation of the so-called papillomacular bundle of the nerve most marked in the optic canal. For these fibers certain toxic products have a special affinity, and the scotoma when present is usually first for colors and later for white.

This toxemia as a rule results in a temporal pallor of the disc, but the discovery of the scotoma precedent to the change in the appearance of the disc usually points to the need of immediate improvement of sinus drainage and hence may warrant operative interference when no demonstrable signs of sinus disease are present. If the infecting agent manifests its baneful influence on the intraocular end of the nerve as a choking of the disc, and actual neuritis or further extension into the retina, these significant ophthalmoscopic pictures can readily be determined.

The perimetric findings associated with or the direct outcome of sinus inflammation, have been carefully studied by a considerable group of observers, prominent among whom are: Birch-Hirschfeld, Fuchs, Jessup, Zien, Van der Hoeve, de Kleyn, Markbreiter, Ramsey, Southerland, Samuel D. Risley, de Schweinitz, Knapp, Reber, J. Norman Risley, MacWhinnie, F. J. Parker, Friedenberg and Peter.

There may be concentric or irregular contractions both for form and colors and occasionally bitemporal hemianopsia (Evans-Birmingham), but the scotomas of varying types are more generally present, have more diagnostic significance and indeed those of the socalled peripapillary variety have been regarded by some observers as practically pathognomonic. As the sinuitis is more usually unilateral, so is the central scotoma. This fact has received special emphasis by Weeks of New York, but this will of course vary with the extent of the sinus involvement and may be bilateral and be present both for form and colors. The scotomata of the more usual toxic varieties caused by the various systemic toxemias are much more apt to be bilateral.

In our study of central scotoma three important groups representing varying types of causation must be considered from a differential viewpoint.

First: Toxic amblyopias caused by alcohol, tobacco, lead, arsenic, iodoform, stramonium, carbonioxide, mercury, opium, malefern, etc.

Second: Intestinal toxemia, syphilis, tuberculosis, diabetes, gout (socalled), gonorrhea, influenza, malaria, the infectious fevers.

Third: The mouth, teeth, tonsils and accessory nasal sin-

uses, and it has been generally believed that the posterior sinuses are the special offenders.

It must always be kept in mind that one or more of these systemic conditions may be responsible for a toxemia which induces the nerve changes or may result in the sinus empyema, which in turn may be the direct excitant of the nerve or retinal lesion. Hillizter (*Wien. klin. Rundschon,* October 8, 1911) believes optic nerve conditions due to involvement of the ethmoid and sphenoid sinuses are as a rule diagnosticated by exclusion.

In the absence of intoxications with a negative Wassermann the presence of an axial or retrobulbar neuritis, acute or chronic (especially if unilateral, since in the former condition the nerve disturbance is usually bilateral), the possibility of a disseminated sclerosis should be carefully considered and under such conditions disturbances of gait-sensation, reflexes should be studied, and indeed if a sinus infection is present, such as ethmoiditis, for example, combined with the symptoms of disseminated sclerosis, as was true in a case reported by Shumway, the possibility of the toxin from the purulent focus causing the nerve degeneration as suggested by that author must likewise be kept in mind.

The differentiation between the fields of vision and intraocular states due to sinus disease and those due to or associated with general toxemias, in which no sinus disease was suspected nor present, are, as pointed out by S. D. Risley, sometimes exceedingly difficult to make.

Central scotoma, narrowing of fields, edema of fundus, veiling all details, large dark tortuous veins, hemorrhages in fibre layer of retina or at the macula may be present and yet it may be impossible to demonstrate sinus disease. On the other hand, all of above symptoms may be present in association with disease of one of the sinus in the anterior segment of the skull and it is not always easy to say they were caused by it, as both the sinus and ocular disease were associated with and probably caused by the same systemic toxemia.

Paracentral scotomas of horseshoe shape, disappearing in segments, are described by MacWhinnie and a similar variety is emphasized by de Schweinitz, the paracentral often be-

coming hemianopic and resembling the hemianopic scotoma of Treitel.

The crescentic field defects, such as reported by the same author in a case of posterior ethmoiditis combined with tooth abscess, may be part of a ring scotoma, either previously present or not yet completely formed and easily influenced by measures to remove the toxemia, that is to say, treatment of sinus and tooth.

The ring scotomatas may become central and usually improve and disappear with adequate drainage unless permanent damage has resulted from the pressure or toxemia.

The presence of a ring scotoma according to MacWhinnie (quoted by Friedenberg), would indicate accessory sinus involvement even when the retained infection was not evident to the probe. When inspection of the nose points to definite sinus involvement, especially posterior, a typical field will be an enlargement of the blind spot and a paracentral scotoma.

The nerve lesions in central amblyopia consist in edema and proliferation of the glia cells and later possible destruction of the nerve fibre (Birch-Hirschfeld). The cause, according to Birch-Hirschfeld, is venous stasis and toxic agencies.

Bryan believes that nerve toxemias can be caused by mucoceles as well as by abscesses and the symptoms often extremely difficult to explain may be the result of anomalies in the posterior cavities. The sphenoid may be in relation to both nerves. The posterior ethmoid may be, on the other hand, in close proximity to one and not to the other, and furthermore, it is Bryan's opinion that the presence of bilateral nerve involvement may be explained by transference by way of the chiasm without necessarily indicating the presence of a bilateral sinuitis.

In such a study as this special emphasis should be laid upon the work of Van der Hoeve and its further development and confirmation by de Kleyn.

The enlargement of the blind spot constituting the socalled peripapillary or Van der Hoeve scotoma, has been thought to be pathognomonic of involvement of the posterior group of cells (sphenoid and posterior ethmoid); this toxemia ex-

pressing itself upon the peripapillary bundle as the first portion involved in a retrobulbar neuritis.

In attempting to outline a Van der Hoeve phenomenon it must be remembered that the optic nerve as it enters the eye has no ganglion cells, no rods nor cones, and is therefore blind.

This blind spot is located 15° to the temporal side of the actual point of fixation. In hyperopic eyes it is further away as far as 19°, while in myopic eyes it is down to 11°. As to the important question, what actually constitutes an enlargement of the blind spot, Van der Hoeve considered over 6° in the horizontal diameter as suspicious and over 7° as too large.

Van der Hoeve found the peripapillary scotoma only in posterior sinus disease, and maintains that central scotoma, always secondary to sinus disease, appeared later if at all; whereas in toxic retrobulbar neuritis this symptom and the Van der Hoeve scotoma were present simultaneously. De Kleyn noted that the enlargement of the blind spot for colors preceded that for a white.

The presence of this symptom according to some authorities justifies an operation on the affected sinus if no other cause for the blind spot enlargement can be found.

These deductions we will probably modify by reason of the more recent work of Markbreiter in an important paper on the changes in the visual fields in diseases of the nose and accessory sinuses, in which he reported results of investigations of the fields in one hundred cases of empyema, carefully excluding all cases in which the eye itself manifested any changes that might cause any visual field disturbance.

In this series of cases sixty-three involved the anterior group of cells, and of this series seventeen were frontal and thirty-one maxillary, three anterior ethmoid and frontal, nine involved the posterior group, three were cases of pansinuitis, and in the remaining twenty-five the exact location is not specified.

Visual field changes were found in seventy of the hundred cases, although the fundus in each case was normal and the vision perfect. This, it seems to me, is a very important observation.

In the anterior empyemas, field changes were present in forty-eight out of sixty-three cases and in seven out of nine in the posterior group.

Of the seventy cases of defective fields the blind spot enlargement was present in fifty-two, seven showed central and eleven other forms of field defect, such as island ring defects and peripheral contraction.

Markbreiter has never seen enlargement of blind spot pass into central scotoma.

In eleven out of thirty-seven nonsuppurative diseases of the sinuses, field changes were present.

The further important deduction from this study is, that while enlargement of the blind spot constitutes the most frequent of the nerve manifestation of accessory sinus disease, it presents no diagnostic features by which we can positively say whether the anterior or posterior group of cells is involved.

The fact, however, that enlargement of the blind spot may sometimes be present, either with or without surrounding rings of color scotoma, and the further fact that these scotomas may antedate by some considerable time organic changes in the nerve head or other gross ophthalmoscopic alteration, is an exceedingly important observation of Van der Hoeve, de Kleyn, Onodi, and has been confirmed by a number of American observers (de Schweinitz, Norman Risley), and while it may not definitely indicate which sinus or group of sinuses is involved, it constitutes a very significant signpost in the direction of sinus disease.

Optic neuritis and neuroretinitis may be caused by an inflammation of any of the nasal sinuses. In a case reported by Arnold Knapp resection of the anterior half of the middle turbinal and curetting of the posterior ethmoid caused a return to normal vision and fundus, and eliminated a central relative scotoma for white and colors.

An optic neuritis in which the summit of the disc was plus four with an ocular proptosis and reduction of vision to one-fifth of normal, in which frontal ethmoidal drainage by incision under the orbital rim from a point under the middle of the front inward to the nasal front and downward along

its border, with complete recovery, was reported by Dr. Risley. This procedure was adopted in 1903, and the patient, whom I saw this past week, has scarcely any deformity and normal vision. This author much prefers the procedure here adopted as offering adequate drainage and a very inconsiderable scar.

Monolateral optic neuritis may exist for a prolonged period with normal vision as in the case reported by Rau, where a systemic treatment caused marked improvement in a case lasting a year. Recurrence was noted in two years with decreased vision, frontal headache and pain on percussion over the frontal sinus. Examination now showed a maxillary sinuitis of the same side, operation upon which cured the neuritis and largely restored vision.

This case emphasizes the fact that pain is not an absolutely reliable guide, as none was present over the maxillary and all over the frontal.

The tolerance of the optic nerve and retina to interference of toxic products of or direct pressure from ethmoidal empyema, is well illustrated by a case reported by Dr. S. D. Risley ten years ago, before the association of these conditions was by any means so generally recognized. It likewise confirms an equally important observation that the ordinary depleting, absorbing and eliminating measures so generally applied to cases of neuroretinitis with flame-shaped hemorrhages and contraction of the field, will frequently cause amelioration of all the symptoms. The recrudescence of the ocular condition in this instance caused the consulting neurologist to fear intracranial involvement. Operation on the anterior ethmoid cells and consequent drainage of frontal and ethmoid resulted in a complete cure, the latter not having been performed for two years after the initial symptoms.

I venture the opinion that all of us today would immediately take the sinuses into account at an initial visit in the presence of a unilateral neuroretinitis, with or without hemorrhages.

The case of a physician recorded by Parker of New York with concentric contraction, central and Van der Hoeve scotomas, varying with the conditions of the sphenoid and posterior ethmoid cells combined with double papilloedema. is of special interest.

The maxillary antrum was also involved, but the cure of the ocular condition followed operative treatment directed to the ethmoid and sphenoid sinuses, vision at one period being reduced to shadows in each eye and returning to normal only when the last posterior infected cell had been drained.

Retinal thrombosis as symptomatic of sinus disease is referred to by a number of writers, Wendell Reber reporting a case of thrombotic involvement of the central retinal vein which was negative to all types of examination, even rhinologic. In his characteristic phraseology he pictures the nasal disease as sweeping in, doing its damage and possibly disappearing by the time the retinal disease is apparent, notwithstanding a negative examination so far as empyema was concerned he insisted upon rhinological local nonoperative treatment and a cure resulted in four weeks.

Reber believes many of these cases of thrombosis of the central vein are due to undiagnosed latent obscure sinus disease which need not be purulent.

In this perhaps too prolonged recital many vital points have been left for consideration and review by the specialists present whose extensive experience and reputation entitle their pronouncments to the most distinguished consideration.

These subjects include the importance of blood study with hemoglobin determination and differential count, the relation of blood pressure, intestinal toxemia and the varying infections, the conservation of tissue as opposed to its destruction and removal, the value and limitation of vaccine therapy, the bacterial study as indicating the extent to which conservative treatment is justified, the limitations of X-ray and transillumination as adjuncts to accurate diagnostic study, the best conservative nasal treatment, which, according to one author (MacWhinnie), will cure ninety-seven per cent of these cases, the value of suction in the conservative management, and finally the most approved operative intervention so often essential to the preservation of vision and at times to the prevention of meningitic involvement.

The important opinions of the participants in the discussion of the evening have been dug out of the mines of the years of toiling in an effort (in the apt phraseology of Edward Jack-

son) to "Push back the ever widening margin of the unknown."

If our interdependence in our closely allied fields of endeavor has been given an emphasis, the purpose of the writer will have been achieved.

XXII.

OSTEOMA OF THE FRONTAL SINUS, WITH A REPORT OF THE CASE.*

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The comparative rarity of frontal sinus osteoma is only one of its interesting characteristics. In its study we are reminded, as Gerber has said, of certain similarities with that most interesting tumor, the true nasopharyngeal polyp. These two tumors present the peculiarity of benignancy of histologic structure but malignancy of effect upon surrounding structures. Both are tumors which except for the location would be given little thought.

The extension and consequent destruction that the nasopharyngeal polyp can produce cause us to view this tumor in its advanced stage with little short of horror, and in the olden times the frontal sinus tumor furnished an equally dismal prognosis. Berlin has passed himself down to posterity as advising the enucleation of the eye, for example, where a frontal sinus ostema had broken into the orbit, rather than try to remove the tumor.

Bony tumors of the skull and in the region of the sinuses and orbit were a source of considerable mystery to the old physicians. Paget describes one such tumor occurring in the ox which had the enormous weight of 16 pounds. "Petrified brains" was a name given to these often large and irregular bony masses. Their frequent occurrence in domestic animals led to their earlier recognition there. Home in 1799 referred to tumors of the frontal sinus. Bouyer in 1841, Paget. Weiss also had dealings with them. In 1854, however, the extent of knowledge on the subject may be judged by the statement by Wm. McKenzie, in his treatise, that he knew of no case of frontal sinus osteoma in the literature.

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*Read at the meeting of the American Laryngologic Society in Los Angeles, February 21, 1918.

Cruveiller, the eminent French pathologist, in 1856 was the first to give a description of these tumors, that has any real value. He called them "Corps Osseux Enkystes." He believed they developed in the diploe between the two tables of the skull and growing, forced the lamella before them as a capsule or ruptured it.

Virchow studied the subject and was also of the opinion that these tumors originate usually in the diploe and grow inward into the sinus, breaking through the inner table of the skull or carrying it forward as a capsule. He referred to them as enostoses in contradistinction to exostoses.

Spencer Watson was the first to think that these tumors had origin from the ethmoids and the neighboring sinuses.

Arnold in 1873, in considering their origin, brought into the vexed question as to their exact source the suggestion that they probably developed from cartilaginous developmental rests. Following Conheim's dictum that where in development embryologically different tissues come together there is a predisposition toward tumor growth.

In 1881 Bornhaup reviewed the literature and gathered cases that showed the condition was not as rare as had been formerly supposed. He was, however, unable to settle the question of etiology, but considered them of periosteal origin: exostoses. He studied forty-nine cases of encapsulated tumors of the frontal region, twenty-three of these were of the frontal sinus. Most of these forty-nine tumors had origin in the immediate neighborhood of the ethmoid cells.

The ethmoid cells are developed in cartilage. The frontal bone is developed in membrane. The point of union between these bones, that is, the vicinity of the ethmoid cells, is where the extraordinary development of these regions takes place and where cartilaginous rests would occur.

Hucklenbroich, in a splendid review published in 1906, brought the number of cases in the literature to 59.

Gerber in 1907 counted eighty-seven cases. He devoted considerable space to the discussion of the origin of the tumors and did not agree with Arnold's theory. He rather leaned toward the view that they may be due to sinus infection, the infection possibly transient.

Since 1907 there have appeared in the literature the following cases: Corgill, one; Pfeiffer, one; Citelli, one; Hastings, one, in a dry skull and not included by Gerber. This brings the number of cases including the one here reported up to ninety-three.

There is some question as to the exact number of cases that should be listed as frontal sinus osteoma because where the site of origin is at the junction of the ethmoid and frontal bones, the location may be said to be determined by the sinus that contains the greater part of the growth, as it may grow into several sinuses.

The tumors have in the past been often diagnosed by ophthalmologists because of their extension into the orbit. H. Knapp found four such orbital osteomas in 56,000 cases. They occur more often in frontal than the other sinuses.

Kikuzi in an analysis of fifty-four cases found that twenty-six were of frontal sinus, two of nasal cavity, eleven of ethmoid, ten of antrum, five of sphenoethmoid.

Etiology.—Etiology has never been definitely determined and forms one of the most interesting features of the subject. Osteomata occur on other parts of the body without any possibility of determining the cause. There, of course, must be some cause or predisposing factors to disturb the normal development of the bone. I do not believe we have arrived at a satisfactory explanation as yet, though giving honor to the ingenuity that has endeavored to explain the origin of these frontal sinus osteomata.

The attractive theory first promulgated by Arnold, that they were the growth from developmental cartilaginous rests is hardly tenable. His idea was based upon the fact that, inasmuch as the ethmoid bone is developed in cartilage and frontal bone in membrane, developmental cartilaginous rests may occur at their point of union there. There is much that can be said in favor of this interesting hypothesis, but the one fact that these tumors have been found with their point of origin surely and distinctly at some point in the sinus wall well removed from the ethmoid, is sufficient to controvert it. My case is of this type. No cartilaginous débris has ever been found in these osseous tumors. They occur most often in young people, but most bony tumors occur at the time that

the bone is undergoing its greatest developmental activity. The frequency of these tumors in the frontoethmoid region is not to be wondered at when we consider the great activity of growth that takes place in the formation of the sinuses, after birth. It is a recognized fact that osseous tissue wherever situated in the body reacts to trauma by a proliferation of its elements. However, it has been impossible to fix trauma as the causative factor. They often occur in patients whose history is negative and whose health is otherwise normal. According to Killian, they are not due to growth from the osteophytes that one finds in chronic sinuitis. Different forms of bony tumors of the frontal sinus, osteophytes, exostoses, osteomas, are found with not great rarity in the dissecting room. They are more frequent in the male and between the ages of ten and thirty years. The tumors are not always solitary.

Gerber was of the opinion that the tumors originated because of certain changes caused by infection in the sinuses. We know that such infections, often transient, are more or less frequent. A certain proportion (37.5, Hucklenbroich) of all cases are complicated by sinuitis. However, evidence is lacking to prove sinuitis the cause of these growths.

Pathology.—These socalled encapsulated tumors are made up of a hard, often eburnated outer coating or bony capsule, surrounding a more or less cancellous center. The Haversian canals and lacunæ where present are irregular in form and arrangement. There is usually a pedicle joining the tumors to some part of the sinus wall. This pedicle is cancellous in structure. There are a number of cases on record where this pedicle has become detached and the tumor rested free in the sinus. Such are known as dead osteomata. Dolbeau first called attention to them. Tillmans also devoted an excellent article to their occurrence and description. The degree of hardness varies. The white eburnated surface of some tumors led to the name of the earlier writers, "ivory" tumors. They are usually irregular in form, often taking shape from the confining walls. A cross section may show concentric or radiating striæ. They are covered by a connective tissue capsule, perhaps polypoid degeneration, the remains of the lining of the sinus. Unless detached they continue to grow

and are not limited by the containing walls, but press them aside and may, and actually often do, cause their erosion. One is on record the size of a billiard ball. The rate of growth is to be figured in years rather than in months. In rare instances it has been of sufficient rapidity to lead to a diagnosis in less than a year, but in most cases one, two or three years elapsed before the report of the case. One case was only reported after twenty-six years.

Symptoms.—The symptoms may well be divided into two classes, those produced by the tumor while contained in or limited by the sinus, and those caused by its invasion of other cavities of the skull.

In the first class, most prominent and constant is pain or headache due to the pressure of the growing tumor. Up to a certain size, however, the tumor probably always develops without symptoms. The pain may be in the region of the sinus or may radiate even into the occipital region. The tumor in its growth may lead to certain complications within the sinus. It may cause a degeneration of the mucous lining. This, through swelling, may close the ostium frontale, and cystic degeneration and accumulation of fluids may take place. This condition is known as mucocele, and the increasing contents of the sinus may lead to a great thinning of the walls with ultimate rupture and fistula formation.

Hucklenbroich found two cases of mucocele in sixteen cases, 12.5 per cent, and six cases with sinuitis, or 37.5 per cent. The sinuses may become infected and through inadequate drainage into the nose form the typical picture of a chronic purulent sinuitis. These tumors in their growth naturally follow the path of least resistance.

The symptoms of the second class depend upon the cavity involved and the extent of the encroachment. It is to be hoped that henceforth these tumors will be diagnosticated before great damage is done. In the records, however, that come down to us from olden times, the diagnosis of this particular type of tumor was made from the position taken by the embarrassed eyeball. Extensions into the nose or brain went much longer unrecognized.

The classical picture then given, pointing to invasion of the orbit from a frontal sinus osteoma was "proptosis of the eye-

ball, accompanied by outward and downward displacement." It is needless to go into detail as to the variety of damage to sight and the eyeball that would result from such displacement.

Diplopia and optic nerve derangement may be mentioned as prominent and important symptoms. Tumors growing into the nose may lead to external deformity and to internal obstructions. Growths have been reported fairly filling the nasal fossæ.

Extension toward the brain has in the cases reported given rise to symptoms only in the terminal stage where meningitis has developed. Though the headaches may be attributed partly to dural irritation, on the other hand, some of the pain has been thought to be due to direct pressure on the supraorbital nerves lying in the roof of the orbit. The adaptability of the brain to slowly increasing pressure is well shown in the absence of symptoms in many of the cases reported where there was considerable encroachment on the anterior fossa. Exostoses from the inner table of the skull growing inward, on the other hand, often lead to brain symptoms, even epilepsy. Although we would hardly look for the anterior frontal wall to be much disturbed on account of the relative thickness, it is a fact that it is often, especially in double sided tumors, driven forward typically in the region of the glabella. The distension of the cavity is more often accomplished by the cystic and septic contents than by the tumor itself.

Diagnosis.—Besides the clinical symptoms and signs given, the importance of the X-ray in establishing a correct diagnosis should be emphasized. Credit for the suggestion for the use of the X-ray for the diagnosis of frontal sinus osteoma is given to Taranto. Perthes in 1904 published the first occasion of its use for such purpose. It is today undoubtedly the most important method of diagnosis we have.

Huchlenbroich writing two years later gave importance to other methods of diagnosis. He spoke of transillumination, percussion and sounding and washing out of the sinus. Of the X-ray he wrote, "how far the X-ray will serve us is as yet not known, as there are but few observations on its use."

Cargill in 1912, Citelli in 1913, both made use of the Roentgen ray with advantage, and in my case it was the chief

means of making a diagnosis. The size and extent of these tumors are of great importance from the therapeutic standpoint and this has been determined in most of the four cases reported. Apposition to one or another wall of the sinus has been determined.

A bony tumor appearing at the upper inner angle of the orbit suggests always a sinus tumor. However, it may be only an exostosis from the orbital wall and the X-ray is valuable in pointing out here a proper diagnosis. One needs to read the surgical history of these tumors to realize the difficulties that the X-ray has penetrated for us.

A swelling typically located, with fistula, leading into the sinus is almost diagnostic, but here again we may have to exclude a simple cyst that rarely arises from one of the glandular elements in the mucous lining of the sinus.

Prognosis.—This has been radically changed since the advent of aseptic surgery. For this reason the older statistics are of little account. In the earliest cases death followed so commonly that they were looked upon by some of the ablest surgeons as inoperable. Bornhaupt found a mortality of 63 per cent in eleven operated cases. In seven cases the patients died with brain complications. In two cases the end result was unknown. In only two cases was there a radical cure. As said before, most of these cases were before the days of asepsis.

Hucklenbroich reports statistics of cases operated upon between 1850 and 1874. Twenty-eight cases with 28.6 per cent mortality, and between 1870 and 1900 three deaths in forty-six cases, 6.5 per cent. Some of these cases were possibly not frontal sinus osteomata, strictly speaking. There were no deaths, according to his own statistics, based upon fifteen cases gathered from 1900 to 1905.

Surgery of the frontal sinus was greatly advanced by Killian's work. It is especially where the sinus is badly infected and free drainage is necessary that the surgical principles worked out by him are appreciated.

Treatment.—The treatment is complete surgical removal of the growth by external operation. This means has been employed for generations with the gradual improvement noted under prognosis. A history of the development of our pres-

ent technic chronicles some experiences demonstrating the courage of the old surgeons, as well as the fortitude of the patients.

Bouyer reports a case in 1841 of a frontal sinus osteoma in a man of thirty-four. He gave the patient fifteen drops of laudanum and attacked the growth, the patient sitting in a chair. After some hours of hammering and chiseling he succeeded in removing the growth. He gave the patient fifteen drops more of laudanum and put him to bed. He was about in a few days.

All sorts of incisions in the skin have been used to reach the tumor. The extent and location of the opening must depend upon the clinical picture. The X-ray can help here again by giving an accurate idea of the extent of the tumor. Where possible, the technic of Killian is ideal and this incision can be joined by vertical ones, preferably in the median line, when necessary. The anterior wall is to be removed widely enough to permit of easy access to the tumor and its dislocation and removal. Where possible the superciliary ridge should be preserved for cosmetic purposes.

When the tumor has been removed and the contents of the sinus cleaned out, the question of drainage arises. The natural drainage is downward and should be established as per the Killian method where the nature of the contents of the sinus makes drainage necessary.

If reasonable presumption leads one to think that no drainage is necessary the wound may be closed, or a bit of gauze put in at the external angle of the wound.

Case Report.—Mr. C. N., a Dane, age twenty-five years, occupation engineer, came to the Neurological Clinic of Stanford University, October 3, 1917. He was referred from another hospital with the following letter, which is included to show the serious status and the grave condition that was simulated:

"The bearer is a rather obscure neurologic case. We are therefore sending him to your clinic for the benefit of any further diagnostic and therapeutic suggestion which you might be able to make. The patient's history is negative, except for the following facts: Headaches ever since he can remember, formerly frontal, now occipital, more severe,

occasionally associated with fever. Instrumental birth. Two falls on head in childhood which dazed him for several hours. Usual children's diseases. No acute infections. Venereal diseases denied. No convulsions. Has had definite dream states. Physical and neurologic status show nothing of importance. Eyeground negative. X-ray examination of skull and spine negative. Urine negative. Blood—red blood corpuscles, 5,000,000; white blood corpuscles, 11,000; polys, 64 per cent; Wassermann negative. Spinal fluid puncture repeated one week after first—clear, colorless; pressure not increased; cell count 40-50 cells per cm.; Nonne markedly positive; sugar negative; Wasserman negative; differential, mostly lymphocytes. A specimen has been sent for examination for tuberculosis; report not yet available. Diagnosis: Probable diffuse tumor of brain."

Examination.—October 5, 1917. Complains of headaches in back of head on left side and directly over left eye, all his life, formerly in front of head. Since 1906, present location. Formerly headaches two or three times a week, now continually since three months, growing in intensity. Has lost about thirty-five pounds in six months. Feels well otherwise. Appetite is good. Sleeps well. Pain ceases when he goes to sleep. Is awakened by pain and walks floor about once a week. No headaches since entering hospital. No trouble with nose. No discharge. No trouble with throat. No tonsillitis. Fairly well built, somewhat undernourished male of about five feet eleven inches. Skin of face somewhat pale.

Head.—Shape not particularly abnormal.

Chest.—Moderately well formed. Symmetrical.

Lungs.—Vocal fremitus; tactile fremitus apparently normal.

Percussion.—No particular abnormality. Bases low, eleventh spine, equal. Breath sounds harsh bronchovesical right apical region. No rales.

Heart.—Position, maximum impulse not seen, left border just inside the nipple line, fourth space. Right, beneath the sternum. Sounds of moderate intensity and duration clear, regular.

Pulse.—Regular, moderate volume tension.

Blood Pressure.—Systolic, 110; diastolic, 70.

Abdomen.—Symmetrical. No tenderness. Liver not felt. Spleen felt finger breadth below costal margin. Not tender.

Genitalia.—No particular abnormality noted.

Extremities.—No particular abnormality.

Glands.—Few anterior cervical. Few inguinal. Epitrochlears rather large.

Reflexes.—Tendon, active, equal. Superficial, moderate, active equal. No Kernig. No rigidity of neck. No Babinski. Muscular force fairly good. Sensations apparently normal. No ataxia. No Romberg.

Spinal Fluid.—Pressure 70 mm. Total cells, 2. White blood cells, less than 1.

Nonne negative.

Noguchi negative.

Eyes.—Pupils unequal, right larger than left; both react, but that of right slower.

Vision.—20/20 each eye. No central scotoma. Color perception normal. Fields normal for white and color.

Nose.—Right, normal; a slight deflection of septum. Left, normal. No evidence of discharge.

Pharynx.—Small tonsils, nothing of importance seen.

Nasopharynx.—Clear, normal.

Ears.—Right, normal; left, normal.

Larynx.—Normal.

Hearing.—Schwabach normal, Weber not localized, Rinné positive, right and left. Right: watch, 36/36 low whisper, 15/15. Left: watch, 36/36; low whisper, 15/15.

Labyrinth Examination.—Normal.

X-ray Report.—Examination of skull shows presence of an abnormal shadow within the left frontal sinus, apparently causing some enlargement of the sinus. Skull otherwise negative. Nature of this growth radiographically doubtful, polyp or new growth.

Diagnosis.—Osteoma of left frontal sinus. Advise removal.

Operation, October 11, 1917.—Brow not shaved. Killian incision, frontal sinus entered, leaving the orbital ridge intact. In taking away anterior wall of sinus I had cut into tumor before I realized that I was in the sinus, as the tumor

was in perfect apposition with anterior wall at that point. The remainder of the anterior wall of sinus was removed and then the tumor was elevated with a small lever and removed. No attachment to the sinus walls was found and probably none existed, but cannot say definitely because of having cut into the tumor at one point. That may have been the area of attachment. If so, it was attached to the anterior wall and is a case in point against Arnold's theory of origin for these tumors.

Although the lining of the sinus was injected and thickened and there was some fluid present in which shining particles were seen, probably cholesterin, there was no evidence of infection and so the wound was closed. A probe was first passed downward through the osteum into the nose, showing it to be patulous. A small rubber tube drain was inserted at the outer angle and removed the following day. Operation time, fifty minutes.

The healing was immediate and patient left hospital October 18. Seen last, December 21, wound healed, no disfiguration, perfectly free from all symptoms.

Histologic Examination.—Dr. Ohpul's report: Sections show spicules of bone between which the narrow space is filled with fibrous and fatty tissue. The tumor is irregular in form, 2 cm. by 2 cm. by 1.5 cm.; weight, 47 grains.

Diagnosis.—Osteoma of frontal sinus.

This tumor may have been a dead osteoma free in the sinus or, as remarked, it may have been attached to the anterior wall. In any case, there was no contiguity with the ethmoid region and so controverts Arnold's theory of etiology.

It is the first case, as far as I know, where a diagnosis has been made of such a tumor where there have been no external bony changes to indicate its presence.

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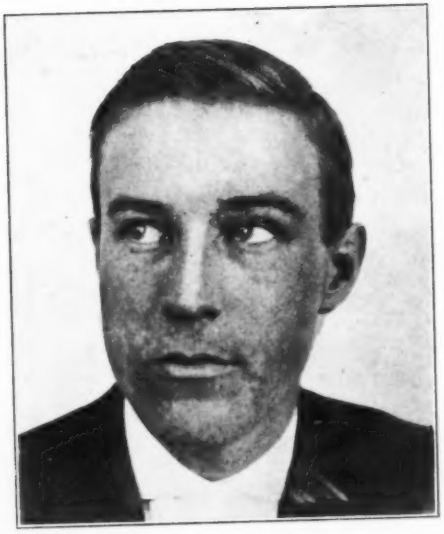
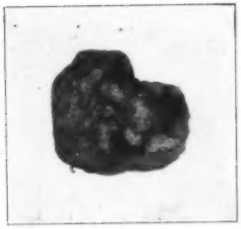


Photograph taken shortly after operation.



Photograph of tumor. Actual size.

Section of tumor.

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XXIII.

THIRD YEAR OBSERVATIONS OF CLINICAL OZENA AND ITS VACCINE TREATMENT.

BY

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INTRODUCTION.

In the past year our investigations relative to fetid ozena have been chiefly clinical. Our work has been considerably enhanced by virtue of the prize award of the Pacific Coast Oto-Ophthalmological Society, whereby we were enabled to procure suitable cageings for the animals used in these studies. We have enjoyed, also, the cooperation of many rhinologists throughout the country, and take this means of thanking them for the submission of material for bacteriologic study, for clinical data of cases under observation, and for many valuable suggestions pertaining to our work. In order to acquire a broader expression of the clinical aspects of atrophic rhinitis, and to determine what general value has been attained through vaccine therapy in this condition, a comprehensive questionare has been submitted to all interested in this subject.

In our previous bacteriologic studies we were impressed by the striking resemblance of the coccobacillus fetidus ozenæ of Perez to B. bronchosepticus, the specific organism of canine distemper. To facilitate the bacteriologic nomenclature we had deemed it advisable to group the coccobacillus of Perez with B. bronchosepticus, and proposed its designation as B. rhinosepticus as a more fitting appellation. This change in name we have followed in our recent contributions upon this subject.

It was our purpose to limit our investigations along certain specific lines and to determine:

(1) The existence of different types of ozena upon a bacteriologic basis, and to establish the relationship of atrophic rhinitis to accessory sinus disease.

(2) The clinical relationship of B. rhinosepticus and the B. Friedlander group to ozena.

(3) The value of specific vaccine therapy in the various types of atrophic rhinitis.

We have tabulated these results, and note a considerable degree of similarity in expressions of the clinical aspects of ozena as well as results attained through vaccine administration. The brevity of questionare answers cannot fully allow individual expression, and we are therefore incorporating in this report such personal communications as are pertinent and more illuminating to the subject in hand.

CLINICAL DIFFERENTIATION OF TYPES.

It is apparent that the inclination to group all the types of atrophic rhinitis with crusting and odor as fetid ozena, and to consider them from the same etiologic viewpoint, or apply to them the same therapeutic measures, is obviously incorrect. In our previous communication on this subject we laid stress upon accessory sinus involvement as complicating fetid atrophic rhinitis, and presented such bacteriologic studies to demonstrate the constant presence of B. rhinosepticus or some type of the B. mucosus capsulatus group in all cases of fetid atrophic rhinitis. We are convinced that in these cases the accessory sinuses are too frequently disregarded, and that turbinal atrophy is at times a secondary process. Mechanical intranasal distortion, allowing accumulation and organization of secretions, might create a favorable environment for bacterial lodgment, especially for the Friedlander organisms. Permanent escape of the accessory sinuses from infection from a chronically infected contiguous membrane seems hardly possible. In more than fifty per cent of cases of fetid atrophic rhinitis under study was there definite accessory sinus involvement, especially of the sphenoidal and ethmoidal cells. Whatever the nasal pathology may be, its importance seems distinctly subordinate to the condition of the contributal nasal chambers, and demands a different consideration from fetid atrophic rhinitis simplex.

Whilst a certain conflict of bacterial entities, namely, B. rhinosepticus and the Friedlander group organisms, still prevails in culture findings, the constant presence of one of these types in all cases of true atrophic rhinitis (fetidus) lends encouragement to the establishment of a bacterial cause.

There is still a third group, presenting some odor, a thickened dirty mucoid secretion rather than crusting, and turbinate hypertrophy rather than atrophy. Sinus involvement may or may not coexist. The organism rhinosepticus is never recovered from these cases, although the Friedlander bacillus is not infrequently isolated in luxuriance. There appears to be neither clinical nor bacteriologic foundation for grouping such cases with fetid atrophic rhinitides.

CLINICAL RELATIONSHIP OF B. RHINOSEPTICUS AND B. FRIEDLANDER GROUP TO OZENA.

In our previous communication on this subject we were inclined to ascribe, from the bacteriologic viewpoint, to B. rhinosepticus the sole etiologic rôle in clinical ozena. B. Friedlander was looked upon as a secondary invader. Although the coisolation of B. rhinosepticus was noted in a few instances of Friedlander cases, the latter organism seemed destined to dominate the entire bacterial stage—an end-reaction of immutual symbiosis. There have arisen as yet no impressions to indicate a recession from such assumption. The final solution of this problem, however, must rest upon bacteriologic experimentation. These have not as yet been sufficiently advanced to warrant definite conclusions.

Certain clinical results, also, tend to emphasize the etiologic importance of B. rhinosepticus, in that improvement usually occurs in cases of fetid ozena from which both organisms are isolated, under rhinosepticus vaccine treatment, but no results have ever been obtained with even an autogenous Friedlander vaccine. Even frank Friedlander infection cases at times respond gratifyingly to rhinosepticus vaccine, although the marked failures and most discouraging results have always been in cases of seemingly pure B. Friedlander infection with extensive accessory sinus disease. Again, in a considerable number of instances, initially giving plate colonies of B. Friedlander and absence of B. rhinosepticus, the rhinosepticus or-

ganism was isolated after several injections of this vaccine. We offer in explanation of this occurrence the theory of focal activation of a deeper or higher seat of infection.

Reference has been made to the common existence of Friedlander bacilli in rhinitis when associated with accessory sinus involvement. This organism often appears to persist in pure culture under such conditions. We are, though, mindful of the probable prior sinus invasion by rhinosepticus, or that secretions are mechanically arrested through atrophy and enlargement of the nasal chambers, creating an ultimate Friedlander habitat.

Persistent absence of B. rhinosepticus findings in nonfetid atrophic rhinitis, chronic hypertrophic rhinitis, sinuitis without odor and normal individuals, is one of the strongest arguments presenting itself in determining the etiologic relationship of this organism. In the past year a consistent endeavor has been made in determining, from a clinical standpoint, whether or not this organism might be but a simple saprophytic entity. Bacteriologic findings have been uniformly negative. Of interest also is the paucity of bacteria noted in nonfetid nasal affections and in the nasal cavities of normal individuals.

We have as yet pursued no definite lines of investigation in determining the modus and means of infection. We are, though, inclined to support the original contention of Perez, in that the disease is acquired from dogs. This hypothesis is apparently negatived in the clinical charts herewith presented; nevertheless, we feel that the question of animal pets has been too closely answered in that through the general domestication of the dog a much more liberal contact has been indulged in. An interesting case in point of contact and possible bacterial communication has come to our attention. A mother and child presented themselves with definite clinical ozena. On interrogation it was found that a pet dog was afflicted with a chronic nasal catarrh, which condition preceded that of the humans. Bacteriologic examinations revealed a B. rhinosepticus infection in the mother and child, and a B. bronchosepticus infection in the dog—apparently a distemper carrier. We are as yet compelled to reserve comment upon these findings.

We do not find the isolation of B. rhinosepticus encumbered

with any difficulties, and are becoming more and more rigid in our demand for the demonstration of this organism in sustaining the diagnosis of true ozena. During the year, three hundred and forty-three specimens were submitted for bacteriologic study. These cases embrace the entire gamut of intrarhinal pathology as well as a certain group of individuals with normal nasal mucous membranes. Of this number the cultures from one hundred and twenty-six cases showed B. rhinosepticus—all clinically true ozenas—and seventy-six cases, a portion of which were apparently true ozena, gave exclusive B. Friedlander cultures. Of twenty-two of the B. rhinosepticus culture cases were cultures mixed with B. Friedlander. B. pyocyaneus was present in four instances. The presence of this organism makes the isolation of other organisms difficult and often impossible. One hundred and thirty-seven cases were negative to either B. rhinosepticus or B. Friedlander, and were often sterile.

TABLE I.

BACTERIOLOGIC SUMMARY OF NASAL SECRETIONS EXAMINED DURING THE PAST YEAR, INCLUDING CASES OF TRUE ATROPHIC RHINITIS, NONATROPHIC RHINITIS, AND NORMAL INDIVIDUALS.

B. Rhinosepticus:		
Alone	104	
With B. Friedlander	22	
Total		126
B. Friedlander:		
Alone	76	
With rhinosepticus	22	
Total		98
B. pyocyaneus		4
Negative to B. rhinosepticus, or B. Friedlander, or sterile cases		137
Total		343

VACCINE THERAPY.

We deem it a far cry to attempt to establish the etiologic relationship of a microorganism to a certain disease through clinical results obtained by injections of suspensions of the killed organism in question. The fundamental purport of our investigation has been one of etiology. On the other hand, whilst appreciating the caution necessary in attempting to establish the causal relationship of a certain microorganism to a definite morbid process, we have inclined to vaccine therapy in the hope of finding some more potent weapon of combat against this obnoxious disease, to strengthen our heretofore limited and unpromising measures of relief.

Whether or not the rhinosepticus vaccine is specific, or through the parenteral digestion of a foreign protein the colloidal dispersion renders a mobilization of ferments, thereby elevating the titre of infection resistance, is a moot point in biology still to be determined. We are dealing with a focal infection, distinctly insidious and chronic. Intravenous vaccine injections have produced a transient leucocytosis and constitutional reaction, without in any way influencing the intranasal conditions. Subcutaneous injections have, on the contrary, afforded us promise of amelioration of the manifestations of a heretofore hopeless condition. Clinical improvement is the common response. Clinical cures have been rare in that relapse after discontinuance of treatment is not infrequent. Bacteriologic cures, except in one or two instances, have never been obtained. Ample drainage in conjunction with vaccine administration appears to be the most fruitful method of treatment, where there is accessory sinus involvement.

Incident to a scattered and dissociated therapeutic investigation, and with an aim at uniformity, a certain empiricism must of necessity obtain. In supplying a vaccine quite generally throughout the country for the treatment of ozena, we have prescribed such outlines of administration, in reference to dosage and injection interim, as were suggested by our own experience. We have advised as an initial injection about 200,000,000 killed organisms, increasing this and subsequent doses by 200,000,000 every fourth day. Such dose first preceding that inductive of constitutional reaction is termed the

dose of tolerance. This usually occurs between the administration of the 600,000,000 to 1,000,000,000 dose. The interim of injection is now lengthened to seven days and the doses increased about 250,000,000.

In the main, the treatment of our own cases has followed this outline. We have found it necessary, though, to exercise a considerable watchfulness of the patients' individual variation in regard to idiosyncrasy, susceptibility and toleration. Some patients seem unable to tolerate small doses of vaccine, but after a persistent endeavor take relatively large doses without discomfort. Some show no improvement through this method of therapy until excessively large doses are reached, whilst we have noted an occasional patient respond clinically only to small doses and with marked and discomforting nasal manifestations on large doses. In other words, it is our impression that the vaccine treatment of ozena parallels that of most other insidious and relatively benign infections. We have not as yet a suitable measure or index of immologic response other than our clinical sense. The vaccine therapy of ozena is encumbered, and the negative results encountered, like unto the chronic infections in general.

ABSTRACT OF CASE REPORTS.

The response to a questionare submitted by us to those having used the vaccine prepared by us during the past year were on the whole very satisfactory. About thirty-five records were filled out with sufficient detail upon which reliable conclusions could be based.

It would appear from these answers that ozena is a widespread disease, prevalent in all parts of the United States, afflicting rich and poor, children and the middle aged, those in urban and rural communities, and showing no choice or disregard to occupation and vocation. Nor does it appear that the disease has a predilection for those living in a questionable hygienic environment.

From various sources we gather the impression that many cases of ozena have been neglected owing to unpromising measures for relief at disposal, and that the ozena patient was rather

looked upon as an unwelcome visitor. Latterly there appears to be a distinct revival of interest in this subject, as well as a keener appreciation of the importance of associant accessory sinus involvement. Liberally discounting our own zeal in advancing a vaccine for the treatment of these cases and the general enthusiasm engendered by any new therapeutic measure, it nevertheless appears that the results of treatment by means of vaccine have been on the whole satisfactory and in some instances brilliant.

A general survey of the clinical comments of other observers and their vaccine results check remarkably well with our own experience. Clinical cures have been claimed with reservation and many relapses have been noted. In Table II are shown the end-results of vaccine treatment of cases reported by us in our previous communication. We have had opportunity of studying twenty-six additional cases, and these are charted in Table III. In Table IV are shown the reports of clinical aspects of ozena as noted by other observers, with comments on vaccine therapy.

Briefly summarizing the salient features of clinical ozena, we may conclude as follows:

Family History.—There is an apparent negation to the claim of the frequent infection of other members of the same family.

Infection From Animals.—As charted, it appears that the possibility of infection from lower animals, especially dogs, is decidedly remote. We feel, however, that too strict an interpretation of animal contact and animal pets has been indulged in that the domestication of the dog is a most common custom in this country. We feel that, upon a bacteriologic basis at any rate, the original contention of Perez will ultimately be proven to be the truth.

Odor Detected by Patients.—The previously held belief that patients with ozena of long standing ultimately lose the ability of detecting their own odor is apparently incorrect.

Characteristic Odor.—The odor from the ozena patient is so variously described that it appears impossible to correctly qualify it. We have at times been inclined to note an odor as "not characteristic" and be supported by negative bacteriologic findings. On the other hand, the organism of Perez

has been isolated when no odor whatsoever existed. The inclination is to ascribe the odor, both in character and degree, to the extent of atrophy and possibilities of drainage, rather than to the products of the activities of the causal micro-organism.

Characteristic Crusts.—There are no characteristic crusts in ozena. The type depends upon the age, extent of the process, and the mechanics of the intranasal condition. In the very old, highly atrophic cases, the flaky white crusts simply represent the normal condition for a given amount of atrophy.

Atrophy.—In old cases atrophy is almost invariably bilateral. We have, however, every reason to believe that a unilateral ozena can exist.

Accessory Sinuses.—In eighty-five per cent of our cases was involvement of the accessory sinus more than probable. This point has been discussed elsewhere in this paper. We think it highly probable that in every case the sinuses are invaded by the offending organism, and no form of treatment can be considered which does not give proper weight to this fact. The frontals, because of the difficulty of examination, we know nothing about; the other sinuses seem about equally involved.

Clinical Probabilities Before Bacteriologic Examination.—It would seem that there is a certain clinical complex characteristic of bacillus rhinosepticus ozena. In our twenty-six cases, judged before the bacteriologic study, only three mistakes were made as to the true bacteriologic nature of the complaint. This would seem to indicate that the ozena due to bacillus rhinosepticus and Friedlander group are clinical entities, and should be classed as such in contradistinction to marked atrophic rhinitis with odor and crusts due to syphilis, tuberculosis, and other constitutional diseases.

Vaccine Injection.—The average number of injections used ranges around fifteen. The improvement was usually noted by the fourth injection, and continued up to the twelfth or fifteenth. From then on it seems to settle itself down into a long process of supplying the patient with enough antibodies to keep the disease well under control, and in some cases can be continued indefinitely with good results.

CHARACTER OF REACTION.—With proper vaccines, given in proper doses, the reaction is never severe. Marked symptoms are to be avoided. The best results are obtained where one remains just under the reaction point. The seven day interval, after the proper dose has been reached, seems to be the most convenient and most useful.

RESULTS.—Although our main interest in the study of ozena during the last three years has been largely confined to the question of etiology and clinical pathology, general interest seems to be in the results. The beneficial result of vaccine treatment was marked in the great majority of cases. End results or the permanency of clinical cure have been difficult to establish, owing to the fact that certain cases were lost from observation when crusting and odor disappeared. Thus in twenty-three cases treated in Chart II of our last year's report, thirteen noted as clinical cures did not return for treatment.

SUMMARY OF 1916 RESULTS, STILL UNDER OBSERVATION.—Case 1, the priest, who was obliged to douche his nose every few hours in order to carry on his confessional work, has had no return of symptoms as far as crusting and headaches, but from time to time notices a slight odor, easily controlled by an occasional douche.

Case 2 remains a clinical cure, without crusts and odor, and never has to douche the nose. The B. rhinosepticus can always be demonstrated.

Case 3, one of the most evil smelling of this series, remains clinically cured without any local treatment. This person could not be admitted to the reception room on account of the foulness of odor.

Cases 10, 11 and 12, mother and two children, remain about the same. The treatment has been almost continuous throughout the year. Because of positive complement fixation test for tuberculosis, it is possible we are dealing with a latent tuberculosis, which may account for the poor results.

Case 14, a young woman whose engagement was broken on account of the odor, has remained a remarkable clinical but not a bacteriologic cure. The girl married her former affianced and considers herself cured.

Case 21, Sister P., three years under treatment for pansinuitis, remains clinically but not bacteriologically cured. She has had no vaccine treatment for the past year.

Case 22, dentist, who was obliged to limit his practice on account of the odor, remains a permanent clinical cure. He has had one or two short vaccine treatments throughout the year, and still gives a positive B. rhinosepticus.

Thus it will be seen that every case in Chart II reported as clinical cures have remained so, a very satisfactory record. The constant presence of the B. rhinosepticus shows that these cures are not permanent, but that antibodies must be supplied indefinitely in the form of small doses of vaccines, repeated at intervals, for an indeterminate period.

Chart III contained nine cases, eight Friedlander ozena, treated with our vaccine. Seven of the nine noted as clinical cures did not return for further treatment. The other two have remained entirely well without vaccine or local treatment during the year. The Friedlander is still present in cultures.

ANALYSIS OF RESULTS OF NEW CASES TREATED SINCE LAST REPORT.—Twenty-six cases are reported in our new series (Table III). Six were untreated. Five did not improve. Six cases were improved as the results of operative drainage on the sinuses, and no credit was given to the vaccine. In the nine remaining cases great improvement or clinical cures are noted.

Of the five cases showing no improvement, only one was a true B. rhinosepticus ozena. This case received but three injections and did not return.

The remaining nine cases form a happy paragraph in the therapy of this disease. The improvement was marked, in some cases very striking, the crusts and odor rapidly disappeared. The frontal headaches invariably cleared up after the third or fourth injection. Weight and general condition improved. These and the last year's series have been carefully and fairly studied. We see no reason to change our conclusion of last year (No. 5), that "at present mixed vaccines made from various strains of the Perez bacillus (B. rhinosepticus) is the most practical method of treatment which is now available."

TABLE II

TABLE II

SUMMARY OF CASES REPORTED BY US IN 1916, WITH COMMENT ON CONDITION A YEAR LATER

No.	Old No.	Name	Age	Sex	Nationality	Referred By	Clinical Diagnosis	Bacteriologic Findings	Agglutination	Number Injec.	Crusts	Odor	Results, 1916	Results, 1917
1	1	Adolphus	28	M.	German	Dr. Victors	Ozena	Perez	+	20	....	....	No crusts, no odor. Clinical cure. Under treatment	No vaccine treatment for months. No crusts. Slight odor at times, easily controlled by salt water douch. Sinuses not investigated.
2	2	Alpert	22	M.	Russian Jew	Dr. Richards	Ozena	Perez	+	10	....	....	No crusts, no odor. Clinical cure	Clinical cure.
3	10	Miranda, Mrs	37	F.	Spanish	Poly	Ozena	Perez	+	9	....	....	No crusts, no odor. Under treatment	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
4	11	Miranda, J.	11	M.	Spanish	Poly	Ozena	Perez	....	9	....	....	No crusts, no odor. Under treatment	Result very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
5	12	Miranda, H.	12	M.	Spanish	Poly	Ozena	Perez	....	9	....	....	No crusts, no odor. Under treatment	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
6	14	Plant	20	F.	American	Office	Ozena	Perez	+	19	....	....	No crusts, no odor. Clinical cure	Remains clinical cure. See detailed report in body paper.
7	20	Sponner	35	M.	American	Office	Atr. rhin.	Perez	—	5	0	0	Ozena larynx. Great improvement	Cured.
8	21	Prescella	22	F.	German	Office	Pansinuitis	Perez	—	19	+	+	No crusts, no odor. Clinical cure	Remains clinical cure. See detailed report in body paper.
9	22	Weber	27	M.	American	Office	Ozena	Perez	+	14	+	+	No crusts, no odor. Clinical cure.	Remains clinical cure. See detailed report in body paper.
10	8	Kelleher	17	F.	German	Dr. Victors	Ozena	Perez	+	20	+	+	No crusts, no odor. Clinical cure. Under treatment	Persisting slight odor. No crusting as long as occasional vaccine.

TABLE III

CLINICAL SUMMARY OF OZENA CASES OBSERVED BY US SINCE LAST REPORT, WITH COMMENT ON EFFECT OF RHINOSEPTICUS VACCINE

No.	Initials	Age	Sex	Social Condition	Nationality	Occupation	Service	Duration	Other Members	Played with Dogs	Change in Odor	Patient Detects Odor	Character of Odor	Character of Crusts	Atrophy	Accessory Sinuses	Clinical Probabilities Before Bacterial Examination
1	M. J.	30	F.	S.	American	Housewife	U. of C.	Childhood	No	No	Some	No	Slight	Slight, whitish	Marked, bilat.	Ethmoids ?	Not B. rhinosepticus ozena
2	A. S.	16	F.	S.	Italian	Schoolgirl	U. of. C.	Childhood	No	No	Some	Yes	Slight, not characteristic	Blackish	Marked, bilat.	Ethmoids ?	Not B. rhinosepticus ozena
3	J. P.	22	M.	S.	Spanish	Student	U. of C.	Childhood	No	No	Some	No	None	Whitish	Marked, bilat.	Ethmoids rt ?	Not typical true ozena
4	A. M.	68	M.	M.	Norwegian		U. of C.	Several years discharge	No	No	Some	Yes	Not characteristic, strong	Whitish	Marked, bilat.	Ant. lat.	Not true typical ozena
5	C. E.	58	F.	M.	German	Housewife	U. of C.	Many years.	No		Some	No	Foul, characteristic	Blackish	Marked, bilat.	Ethmoids	Typical of true B. rhin. ozena
6	R. B.	37	F.		Jewish	Housewife	U. of C.	Many years.	No		Some		Very bad	Har, black	Medium, bilat.	Ethmoids	Not typical of true B. rhin. ozena.
7	F. D.	34	M.	M.	Bulgarian		U. of C.	Many years.	No		None	No	None	None	Marked, bilat.	None	Not typical of true B. rhin. ozena
8	R. P.	15	F.	S.	American	Schoolgirl	U. of C.	Many years.	No		None	Yes	Slight, not characteristic	Blackish	Slight, bilat.	L. antrum	Not typical of true B. rhin. ozena
9	E. L.	46	M.	M.	American		Polyclinic	Many years.	No		None	No	Very slight	Slight	Marked, bilat.	Probable	Not typical of true B. rhin. ozena
10	J. S.	55	M.	M.	American	Business	Private	30 years	No		Getting worse	No	Marked, characteristic	Greenish	Marked, bilat.	Sphenoids, antra	Typical true ozena
11	E. H.	35	F.	M.	American	Housewife	Private	Several years.	No		Getting worse	Yes	No	Slight	Marked, bilat.	L. antrum	Not typical true ozena
12	H. I.	23	M.	S.	Japanese	Servant	Private	5 years	No		Getting worse	Yes	Foul, typical	Large, greenish	Marked, bilat.	None ?	Typical true ozena

13	H. F..	55	F.	M.	American...	Housewife.	Private....	15 years.....	No	....	Getting worse...	No	None.....	None.....	Marked, bilat..	.....	Typical old ozena process self limited.....
14	A. B..	....	M.	....	American...	.....	Private....	Several years.	No	....	Getting worse...	Yes	Foul, typical.....	Whitish.....	.....	Probable.....	Typical old ozena process self limited.....
15	G. O..	16	M.	S.	American...	Schoolboy..	Private....	Several years.	Yes	Yes	Getting worse...	Yes	Foul, typical.....	Typical ozena..	Marked, bilat..	No evidence.....	Typical ozena....
16	R. S...	26	F.	S.	American...	Teacher...	Private....	Childhood...	Yes	No	Getting worse...	Yes	Slight, not typical	Light, whitish...	Marked, bilat..	Sphenoid rt.....	Not typical of true ozena .....
17	E. B..	30	F.	S.	American...	.....	Private....	Childhood...	No	No	Some....	No	Slight.....	Slight.....	Marked, bilat..	No evidence.....	Typical old ozena.
18	S. H..	30	F.	S.	German...	Teacher...	Private....	Childhood...	No	No	Some....	Yes	Slight, typical....	Slight, whitish.	Marked, bilat..	Probable.....	Typical old ozena.
19	A. R..	22	F.	S.	American...	.....	Private....	Childhood...	No	No	Some....	Yes	Marked, typical..	Thick, greenish	Marked, bilat..	Sphenoids.....	Typical old ozena.
20	W. M.	50	M.	M.	American...	Machinist .	Private....	Childhood...	No	No	Some....	Yes	Foul, typical.....	Thick, greenish.	Marked, bilat..	Antra, sphenoids .	Typical old ozena
21	G. B..	18	F.	S.	Italian....	Stenog'r...	Private....	Childhood...	No	No	Getting worse...	Yes	Foul, not typical..	Thick, whitish.	Marked, bilat..	Both antra.....	Not typical of ozena.....
22	K. B..	30	F.	M.	Italian....	Housewife.	Private....	Childhood...	No	No	Getting worse...	Yes	None.....	Thin, whitish ..	Marked, bilat..	No evidence.....	Not typical of ozena.....
23	L. W..	42	F.	M.	American...	Housewife.	Private....	Childhood...	No	No	Getting worse...	Yes	Foul, not typical..	Thick, black...	Marked, bilat..	L. sphenoid.....	Not typical of ozena.....
24	E. D...	20	F.	S.	American...	Schoolgirl..	Private....	Years.....	No	No	Getting worse...	Yes	Foul, not typical..	Thick, black...	Marked, bilat..	Probable.....	True ozena.....
25	M. L..	26	F.	S.	American...	Clerk.....	Private....	Years.....	No	No	Getting worse...	Yes	Foul, not typical..	Thin, whitish..	Marked, bilat..	Pan sinusitis.....	True ozena .....
26	L. D..	27	M.	S.	American...	Clerk.....	Private....	Years.....	No	No	Getting worse...	Yes	Foul, not typical..	Thick, whitish..	Marked, bilat..	Pan sinusitis.....	True ozena .....

TABLE III—Continued

CLINICAL SUMMARY OF OZENA CASES OBSERVED BY US SINCE LAST REPORT, WITH COMMENT ON EFFECT OF RHINOSEPTICUS VACCINE

No.	Bacterial Examination	Clinical Diagnosis	Date First Injection	Date Last Injection	Total No. Injec.	Character of Reaction	Disposition of Case	Results	Patient's Statement	Result Last Bac. Exam.	Remarks
1	B. rhin. negative..	Atr. rhin., non-fet. not true ozena.....	10/2/16	3/6/17	9	Insomnia, marked local.....	Under treatment .	No marked result.....	Sleep better, headache better.....	.....	
2	B. rhin. negative.. B. Friedlander...	Not true ozena.....	1/30/16	3/20/17	4	Marked local.....	Under treatment..	No marked result.....	No improvement..	.....	
3	B. rhin. present .	True ozena.....	3/5/17	3/13/17	3	Marked local.....	Under treatment..	No marked result.....	No improvement.	.....	
4	B. mucosus.....	Atr. rhin., non-fet. (acces. sin.).....	10/2/16	3/16/17	13	Marked local and general.....	Under treatment..	Entirely cured, vaccines only partly responsible..	General condition very much improved.....	.....	
5	B. rhin. present.. B. Friedlander ..	True ozena.....	.....	.....	.....	.....	Under treatment..	Vaccine treatment not begun.....	.....	.....	
6	B. of Abels..... B. rhin. negative..	Atr. rhin. foet..... (acces. sin.).....	.....	.....	.....	.....	Under treatment..	Vaccine treatment not begun.....	.....	.....	
7	B. rhin. negative.. Staphy. pyo.aureus.....	Atroph. rhin.....	.....	.....	.....	.....	Under treatment..	Vaccine treatment not begun.....	.....	.....	
8	B. Friedlander....	Atroph. rhin..... (acces. sin.)	.....	.....	.....	.....	Under treatment..	Vaccine treatment not begun.....	.....	.....	
9	Staphy. pyo. aureus.....	Atroph. rhin..... (acces. sin.).	10/24/17	3/29/17	5	Slight.....	Discharged.....	No results from vaccine.....	No improvement..	.....	
10	B. rhinosepticus..	True ozena.....	7/15/17	9/15/17	9	Slight.....	Discharged.....	Clinical and bacteriological cure.....	Vast improvement	B. rhin. no longer present.....	
11	B. rhinosepticus..	True ozena.....	1/16/17	1/15/17	6	Slight.....	Discharged.....	Complete cure of crusts due to operation on antrum.....	Cured.....	B. rhin. still present.....	
12	B. rhinosepticus..	True ozena.....	2/13/17	2/22/17	7	Slight.....	Under treatment..	Marked improvement, no odor, no crusts....	Marked improvement	B. rhin. still present.....	

13	B. rhinosepticus..	True ozena.....	.....	.....	.....	.....	No treatment....	.....	.....	.....	
14	B. rhinosepticus..	True ozena.....	.....	.....	.....	.....	No treatment....	.....	.....	.....	
15	B. rhinosepticus..	True ozena.....	11/16/17	3/16/17	17	Slight.....	Under treatment..	Decided improvement, no odor, no crusts....	Decided improvement.....	B. rhin. still present.....	
16	B. mucosus.....	Atroph. rhin..... (access. sin.)	9/30/16	3/10/17	25	Severe, general...	Under treatment..	Decided improvement, due to work on sinuses	Decided improvement.....		
17	B. rhinosepticus..	True ozena.....	8/8/16	2/9/17	24	Slight, general....	Under treatment..	Decided general improvement.....	Gen. condition, wgt., appetite, odor, crusts, much improved..	B. rhin. still present.....	
18	B. rhinosepticus..	True ozena.....	9/22/16	3/21/17	20	Slight, general....	Under treatment..	Decided general improvement.....	Gen. cond., wgt., appetite, odor, crusts, much improved.....	B. rhin. still present.....	
19	B. rhinosepticus..	True ozena.....	7/7/16	8/17/16	12	Slight, general....	Refuses treatment	No crusts or odor, improvement.....	Patient not satisfied, not improved.....	B. rhin. still present.....	
20	B. rhinosepticus..	True ozena.....	1/2/17	3/23/17	15	Slight, general....	Under treatment..	No crusts or odor, great improvement...	Greatly improved	B. rhin. still present.....	
21	B. Friedlander....	Not true ozena.....	10/20/16	3/23/17	20	Severe, general...	Under treatment..	Improvement slow, due to condition of antra.	No improvement..	B. Friedlander....	
22	B. Friedlander....	Not true ozena.....	10/2/16	3/14/17	13	Slight, general....	Under treatment..	No improvement.....	No improvement.	B. Friedlander...	
23	B. Friedlander....	Not true ozena.....	9/2/16	3/14/17	5	Severe, general...	Under treatment..	Improvement due to opening sphenoid....	When sphenoid clean, no crusts..	B. Friedlander..	Tuberculosis.
24	B. Friedlander....	Not true ozena.....	7/2/16	11/10/16	22	Slight, general....	Under treatment..	Marked improvement, clinical cure.....	Marked improvement, considers herself cured....	B. Friedlander...	Nose not washed for 2 mos. No crusts, no odor.
25	B. Friedlander...	Not true ozena.....	11/15/16	3/16/17	8	Severe, general...	Under treatment..	Clinical cure.....	Marked improvement, considers herself cured....	B. Friedlander...	Double Killian. Both antra and sphenoids oper'd.
26	B. pyocyaneus....	True ozena.....	10/15/16	3/23/17	17	Severe, general...	Under treatment..	Greatly improved, no crusts or odor. Rt. antrum not cured....	Vast improvement	B. pyocyaneus....	

TABLE IV

CLINICAL SUMMARY OF OZENA CASES BY OTHER OBSERVERS WITH COMMENT ON RESULTS OBTAINED UNDER B. RHINOSEPTICUS VACCINE TREATMENT

No.	Initials	Age	Sex	Social Condition	Nationality	Occupation	Service of Dr.	Duration	Other Memb'rs Same Family	Played with Dogs	Changes in Odor	Patient Detects Odor	Character of Odor	Character of Crusts	Atrophy	Accessory Sinuses	Bacterial Examination
1	E. V.	18	M.	S.	Mexican	Waiter	C. E. Ide, Los Angeles, Cal.	Childhood	No	No	Increased	Yes	Strong, characteristic	Dry, thin, whitish	Slight, m. m. swollen	Not evident	B. rhinosepticus
2	M. E.	13	F.	S.	American	Schoolgirl	P. A. Jordan, San Jose, Cal.	Babyhood	....	....	Increased	No	Weak	Greenish	Medium bilat	Yes ?	B. rhinosepticus
3	B. B.	18	F.	S.	American	Student	Geo. C. Albright, Iowa City, Iowa	Childhood	No	S'me	Increased	Yes	Strong, heavy, fetid. Always characteristic	Greenish, dry, hard	Slight bilat	Both antra & ethmoids	B. rhinosepticus
4	A. C.	21	M.	S.	Am. negro	Teacher	W. T. Patton, New Orleans, La.	6 years	No	No	Increased	Yes	Weak	Greenish yellow	Slight unilat	Ethmoids	B. rhinosepticus
5	J. T.	25	M.	S.	American	Salesman	W. T. Patton, New Orleans, La.	10 years	No	No	Diminished	No	Weak	Moist greenish yellow	Slight bilat	No	B. rhinosepticus
6	A. W.	22	F.	S.	American	Housewife	W. T. Patton, New Orleans, La.	5 years	No	No	Increased	No	Weak, characteristic	Dry greenish yellow	Slight bilat	No ?	B. rhinosepticus
7	C.H.T.	24	F.	M.	American	Clerk	F. W. Bassett, Los Angeles, Cal.	10 years	No	No	Diminished	No	At first strong, now none	Hard, dark	Slight unilat	Ethmoids R.	B rhinosepticus B. Friedlander.
8	T. W.	59	M.	M.	Jewish	Manufac'r.	W. T. Patton, New Orleans, La.	40 years	No	....	Slight, diminished	No	Weak, characteristic	Dry, green	Extreme bilat	No	B. rhinosepticus
9	L. B.	27	F.	S.	.....	Nurse	C. E. Ide, Los Angeles, Cal.	Childhood	No	No	Remains same	Yes	Musty, foul	Dry, yellowish green, profuse.	Extreme bilat	?	.....
10	L. S.	35	F.	S.	American	Teacher	F. C. Harvey, Spokane, Wash.	Childhood	No	No	Remains same	Yes	Strong, but varies	Greenish	Moderate bilat	Yes	.....
11	A.M.A	18	M.	S.	Irish	Student	G. Ainslee, Portland, Or.	Childhood	No	No	Cannot tell	No	Weak, characteristic	Thick, green	High grade bilat	Yes ?	None
12	A.C.	43	M.	M.	.....	Restaurant	C. T. Chamberlin, Portland, Or.	10 years	No	No	Same	No	Weak	Thick, green	Bilateral	Yes	.....
13	E.B.	....	F.	M.	American	Bookkeeper	D.H.Trowbridge, Fresno, Cal.	16 years	No	Yes	Diminished	Yes	Strong	.....	High grade bilat	None	.....
14	W.G.	11	M.	S.	American	Schoolboy	Dunbar Roy, Atlanta, Ga.	7 Years	No	....	Increased	No	Strong	Dry	High grade bilat	None	None
15	L.M.	24	M.	S.	American	Med.stud.	G. M. Coates, Philadelphia, Pa.	Childhood	No	....	Increased	No	Very foul, characteristic	Very large, green moist	High grade bilat	Yes	None
16	G.K.	18	M.	S.	American	Garage	J. W. Calkins, Oakland, Cal.	Years	No	?	Diminished	No	None	Dark	Moderate bilat	Mod. bilat	Rod shaped B.
...	...	...	...	...	...	...	...	7 years	No	No	Diminished	No	Strong, charac-	Moist, greenish	Marked bilat	Yes	.....

						Oakland, Cal...				No	?	Diminished	No	None.....	Dark.....	Moderate bilat.	Mod. bilat...	Rod shaped B..
17	B.F...	11	F.	S.	American...	Schoolgirl..	A. E. Owen, Lansing, Mich...	7 years.....	No	No	Diminished	No	Strong, characteristic.....	Moist, greenish	Marked bilat...	Yes.....	.....
18	L.P...	35	M.	S.	.....	Elevator operator...	W. E. Waddell, Los Angeles, Cal.	Several years.	.....	....	Increased...	Yes	Characteristic..	Heavy, greenish	Medium bilat...	Ethmoids....	Mixed pus.....
19	R.H.	10	F.	S.	American...	Schoolgirl..	W. E. Waddell, Los Angeles, Cal.	2 years.....	Fa'r & Sis's	No	Increased...	Yes	Weak, characteristic.....	Heavy, greenish	Medium bilat...	None.....	Mixed pus.....
20	H.B...	27	F.	S.	American...	Nurse.....	C. E. Ide, Los Angeles, Cal.	Childhood...	No	No	Same.....	Yes	Strong, musty..	Profuse, yellow green.....	Extreme bilat..	?	Friedlander....
21	E.G...	18	M.	S.	American...	Student....	P. A. Jordan, San Jose, Cal....	Childhood...	.....	....	Same.....	No	Strong.....	Green dark.....	Medium bilat...	Ethmoids....	B. rhinosepticus negative.....
22	L.B...	22	F.	S.	Cuban.....	Business...	E. F. Soto, Havana, Cuba...	4 years.....	No	No	Same.....	Yes	Weak.....	Green dark.....	Medium bilat...	No.....	.....
23	G.C...	35	M.	M.	American...	Tinsmith..	G. L. Richards, Fall River.....	Many years...	No	....	Same.....	Yes	Weak.....	Few.....	Marked unilat..	No.....	Coarse stout bac. staph. & strep .....
24	C.K...	14	M.	S.	American...	Newsboy..	E. Maxey..... Boise, Idaho....	Several years.	No	Yes	Increased...	Yes	Moderate, characteristic.....	Dirty yellow...	Moderate bilat.	Ethmoids....	Staph (1916)...
25	L.H...	20	F.	S.	American...	None.....	J. H. Allen, Portland, Ore...	15 years.....	No	Yes	Diminished	No	Weak.....	Moderate gray..	Advanced bilat	Ethmoids....	B. rhinosepticus
26	B.W...	12	M.	S.	American...	Schoolboy..	C. H. Brooks, Santa Ana, Cal..	11 years.....	No	Yes	Diminished	No	Characteristic..	Complete blocking of nose, greenish.....	Bilateral.....	Yes.....	B. rhinosepticus
27	J.W...	24	F.	S.	American...	Clerk.....	E. Israel, Houston, Tex...	Childhood...	Ent. fam. 5 ch. &M.	No	Increased...	Yes	Strong, characteristic.....	Heavy, green...	Marked bilat...	Yes.....	B. rhinosepticus
28	M M G	20	F.	M.	American...	Stenogr'r..	E. Israel, Houston, Tex...	1 year.....	No	Yes	Increased...	Yes	Characteristic..	Greenish.....	Mild bilat.....	Pansinuitis...	B. rhinosepticus
29	E.B.	35	F.	S.	American...	Stenogr'r..	E. Israel, Houston, Tex...	2 years.....	No	Yes	Increased...	No	Weak, alkaline.	Greenish brown	No atrophy....	Yes.....	B. rhinosepticus
30	B....	14	F.	S	American...	Schoolgirl..	Dr. Wessels, San Diego, Cal.	3 years.....	Sis.	Yes	Increased...	Yes	Very strong....	Thick creamy pus.....	Severe bilat....	Ethmoids....	.....
31	M.S.	43	M.	M.	American...	Seamstress.	Dr. Wessels, San Diego, Cal..	20 years.....	No	?	Increased...	Yes	Characteristic, very strong...	Dry dark gray..	Bilateral.....	Ethmoids....	.....
32	B....	12	F.	S.	American...	Schoolgirl..	Dr. Wessels, San Diego, Cal..	5 years.....	No	?	Increased...	Yes	Strong.....	Dark and hard..	Medium unilat.	?	.....
33	A....	18	F.	S.	American...	Schoolgirl..	Dr. Wessels, San Diego, Cal..	4 years.....	No	No	Increased...	No	Weak, characteristic.....	Small amount..	Small amount..	?	.....
34	L....	39	F.	M.	American...	.....	Dr. Wessels, San Diego, Cal..	2 years.....	No	No	.....	....	.....	.....	.....	.....	.....
35	A.S.	16	M.	S.	American...	Schoolgirl.	F. E. Emerson, Boston, Mass....	8 years.....	No	Yes	Diminished	Yes	None.....	Small, thin, flakey.....	Bilateral.....	.....	B. mucosus cap.
36	H.D.	14	F.	S.	Italian....	Violinist...	F. E. Emerson, Boston, Mass....	2 years.....	No	Yes	Remains same.....	Yes	Moderate.....	.....	Mod. bilat.....	Negative....	.....
37	J.J.	21	M.	S.	Italian....	.....	F. E. Emerson, Boston, Mass....	8 years.....	Bro.	Yes	Increased...	Yes	Strong.....	Greenish.....	Marked unilat..	.....	B. rhinosepticus
38	O.H.	20	F.	S.	American...	Laundry worker...	E. F. Cannon, Mart, Tex.....	8 years.....	3 oth.	Yes	Better.....	Yes	Strong, characteristic.....	Grayish.....	Bilateral.....	?	.....
39	E.B.	....	F.	S.	American...	Bookkeeper	E.H.Trowbridge, Fresno, Cal.....	15 years.....	No	Yes	Diminished	Yes	Strong.....	.....	Marked bilat...	.....	B. rhinosepticus

TABLE IV—Continued

CLINICAL SUMMARY OF OZENA CASES BY OTHER OBSERVERS WITH COMMENT ON RESULTS OBTAINED UNDER B. RHINOSEPTICUS VACCINE TREATMENT

No.	By Whom Made	Clinical Diagnosis	Date First Inje.t'n	Date Last Inject'n	Total No. Inject'n	Make of Vaccine	Character of Reaction Following Max. Dose	Results—Quotations Attending Physicians	Condition at End of Treatment	Disposition of Case	Personal Communication by Letter
1	Bram, Zeiler, Hill	Ozena	12/29/16	3/15/17	24	Bram, Zeiler, Hill	Lossilutte 1 bil	Swelling reduced, breathing better	Still slight scabbing and odor	Still under treatment	Vaccine produces results unobtainable by older methods.
2	Horn & Victors.	Ozena	5/5/16	3/15/17	24	Horn & Victors	Slight rise temp	Decided improvement, odor disappearing during time of treat.		Patient disappeared.	
3	Horn & Victors.	Ozena	2/5/16	3/6/17	8	Horn & Victors	Marked general and focal	Not completed		Still under treatment	
4	Landford		1/3/17	3/2/17	14	P. D. & Co.	Mostly local	Patient greatly improved, not entirely cured		Still under treatment	Experience lim. to 3 cases very satisfact'y. All cases improvem't marked, cured from patient's standpoint.
5	Landford		2/1/17	3/15/17	17	P. D. & Co.	Mostly local	Greatly improved		Still under treatment	Experience lim. to 3 cases very satisfac'y. All cases improvem't marked, cured from patient's standpoint.
6	Landford		1/14/17	3/15/17	15	P. D. & Co.	Mostly local	Greatly Improved		Still under treatment	Experience lim. to 3 cases very satisfac'y. All cases improvem't marked, cured from patient's standpoint.
7	Horn & Victors.	Atrophic rhin.	1/26/17	3/5/17	14	Horn & Victors.	Mostly local in nose and larynx.	Marked improvement.	Crusts and odor recur.	Still under treatment	
8	Landford	Ozena	1/25/17	3/15/17	6	Horn & Victors	Mostly local	Greatly improved	Patient so far better, does not want further treatment		
9		Ozena	1/20/17	3/16/17	19			Less scabbing	Nose feels better, less scabbing	Still under treatment	
10		At. hin. acces. sin. involvement.	10/29/16	3/19/17	12	Horn & Victors.	Violent chill	No change	Odor seems less		Some doubt as to diag. Probable sinus troub. Not a fair test.
11		Ozena	1/6/17	3/10/17	16	Horn & Victors.	Slight general	Clinically cured	Pat. clinically well, no crusts, no odor, m. m. look bett r	Still under treatment	I believe atrophic condition is less marked.
12		Ozena	11/20/16	3/—/17	22	Horn & Victors.			Odor same, crusting reduced 2/3	Still under treatment	
13	Horn & Victors.		5/15/16				Itching, flushing, nervousness	No change, inj. do not produce better results than ordinary treat.	Odor and scabs a little better	Still under treatment	Gets equally good results with Ag: No: locally.
14			2/6/17	2/13/17	10	Horn & Victors.					
15			12/27/16	2/23/17	8	Horn & Victors.	None	Greatly improved, no odor	Small soft crusts but no odor	Cured	Certainly wonderfully improved, is not entirely cured. Subsequent relapse after long free from crusts.
16	Calkins		1/11/17	3/19/17	20	Horn & Victors	Local	No odor, atrophy improving, crusts better		Discharged	Delighted with the results, hope improvement is permanent.

								No odor, atrophy improving, crusts better		Discharged	Delighted with the results, hope improvement is permanent.
17	Owen	Ozena	1/13/17	3/17/17	15	Horn & Victors.	Marked local and gen	No odor, crusts less, atrophy decidedly less	No crusts, no odor	Discharged	Am pleased with present nasal condition.
18	Simpson	Ozena	10/4/16		12	Horn & Victors.	Slight local, no gen	No improvement			Not as satisfactory a first case.
19	Simpson	Ozena	7/8/16	2/27/17	14	Tuberculin	Marked local	Improvement not marked, but decidedly better			
20	Horn & Victors.	Ozena	1/30/17		10	Horn & Victors.		Note increased moisture			
21	Horn & Victors.	Ozena	12/10/16	3/10/17	15	Horn & Victors.		No improvement			
22		Ozena	2/16/17	3/19/17	11	Horn & Victors.	Local, mild	P. free from headaches after first inj. Less crusts after second, no local treatment		Still under treatment	
23	J. M. Sheffard.	Atro. rhin. and ozena	4/8/16	5/30/17	13	?	Rather severe			Refused further treatment	
24	Horn & Victors.	Ozena	7/15/15	8/27/15	12	Horn & Victors autogenous	2 X	Almost free from crusts, no odor	Practically well for a year	No treatment for a year	Very much better, not entirely cured.
25	Horn & Victors.	Atro. rhin.	3/17/17		6	Horn & Victors.	Mild	Already considerably improved	Improved	Still under treatment	
26	Horn & Victors.	Ozena	12/16/16		26	Horn & Victors.	Intense reaction.	Marked improvement			
27	Horn & Victors.	Ozena	7/22/16	9/14/16	12	Horn & Victors.	Slight	Great improvement			
28	Horn & Victors.	Ozena	9/26/16	1/31/17	21	Horn & Victors	Moderate	Discharge and odor less. Headache better, crusts more fluid.			
29	Horn & Victors.	Ozena	10/18/16	1/9/17	18	Horn & Victors.	No reaction	Much improved, seems entirely relieved			
30		Ozena			4	Horn & Victors.		Improvement			
31		Ozena				Horn & Victors.	Slight	90% better		Patient left town	
32		Ozena					Slight	About cured			
33		Ozena			4	Horn & Victors.		Less crusts and odor		Still under treatment	
34					8	Horn & Victors.	Slight	Slight improvement		Still under treatment	
35	Horn & Victors.	Atr. rhin. with ozena	9/20/16	2/20/17	18	Horn & Victors.	Slight	Patient improved			
36		Ozena	9/26/16	12/1/16	10	Horn & Victors.	Slight headache	Improvement slight	General improvement	Still under treatment	
37	Horn & Victors.	Ozena	8/30/16	12/1/16	15	Horn & Victors.	Slight	Marked improvement since operation on antrum		Improvement probably due to operation	
38		Ozena	3/31/17	Under treatment	12	Horn & Victors.	Slight local	Case under treatment, no conclusion			
39	Horn & Victors.	Ozena	5/15/16	Under treatment	30?	Horn & Victors.	Slight	Very marked improvement		No crusts, odor or headaches	

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

Complete Mastoid Operation—Its Relation to Modern Healing of Mastoid Wounds.

BLACKWELL, H. B., New York,

Ann. Surg. Phila., 1917—LXVI—640.

The operation provides an additional step in the technic of the orthodox simple mastoid operation, namely, the removal by curettement of the external attic wall, exposing the short process of the incus and the head of the malleus at the point of articulation, together with the curettement of the external and internal attic lying respectively external and internal to the malleoincudal body.

The initial skin incision is extended horizontally over the ear to a point about one-eighth inch above and in front of the auricle attachment, passing through the edge of the temporal muscle. The underlying periosteum being elevated, there is a wide and free exposure of the entire zygomatic region.

On completing the normal simple mastoid operation a small, narrow Spratt curette is passed from the antrum directly forward into the attic until the spoon rests immediately behind the external attic wall. The long axis of the curette should be passed parallel to the same plane as the external semicircular canal and held slightly above it. In this position the short process of the incus is below the curette and not subject to injury.

After curetting away the external attic wall the malleoincudal body is exposed and is usually found imbedded in granulations. These are curetted away both in the internal and external attic spaces.

A small loose drain is inserted as far as the attic and the wound is closed from above downward to within the last half or three-quarters of an inch of the incision. A snug

wet saline pack in the external canal and a copious wet saline dressing externally completes the technic. Dressings are changed daily.

The advantages claimed for the operation are:

1. Less likelihood of the development of those serious intracranial and other complications which sometimes follow an inflammation of the mastoid or an operation for its relief.
2. Reduced healing time.
3. The dressings are less painful.
4. An improved cosmetic result.

Arthur I. Weil.

Abscess of Occipital Lobe.

MARTINI, T., AND BERTERINI, J. I.,

Prensa Méd. Argentina, Buenos Aires, 1917—IV—19.

The man had complained of intense headache for two months, vertigo and other symptoms suggesting a cerebellar tumor. There was a history of a suppurative process in the ear two months before. The man was delirious or unconscious when first seen, and it proved impossible to determine the site of the lesion. Death soon followed, and necropsy revealed two abscesses in the occipital lobe, evidently from blood-borne infection, as the abscesses were in the center of the lobe, not communicating with the surface. One seemed to be old and encysted. The other was recent and had evidently just perforated into the lateral ventricle, but the symptoms had all pointed to the cerebellum. *Emil Mayer.*

Hot Air and Calomel Vapors in the Treatment of Catarrhal Deafness and Other Mucous Membrane and Systemic Conditions.

BROWN, EDWARD J., Minneapolis, Minn.,

Med. Rec., N. Y.—1917—October 6.

The writer has found the hot air and calomel vapors superior to any other means of treatment of eustachian and aural catarrh and other inflammations of the mucous membranes. In the treatment of catarrhal deafness, a gentle current of the hot air is passed through the nares and the patient is directed to swallow every few seconds. In case the swelling of the eustachian tubes is such as to prevent the sensation

of air flowing into the ears upon swallowing, after a few minutes of the hot air, the nares should be closed and a sufficient current (minimum) permitted to pass to inflate the ears. The tubes are generally opened with slight if any extra pressure after one or two treatments. In some cases the catheter is used and the hot air applied directly to the tubes. The calomel vapors are then applied to the nasal chambers or directly through the catheter to the tubes and middle ears. The hot air apparatus is a section of half-inch gas pipe about a foot long, placed vertically over a diagnostic gas burner, connected at one end with the compressed air service pipes and at the other with one-fourth inch iron tubing and one-eighth inch brass tubing bent as required to connect by rubber tubing with a glass nasal tube.

The calomel vaporizer is a three-inch section of half-inch gas pipe, over a Bunsen burner, connected at one end with the compressed air, and at the other with a ten-inch section of quarter-inch pipe. The thread of both ends of the latter is filed off to make the ends slightly conical, one to fit tightly in the reducer and the other to serve as a nose piece. One having only electricity could have the tubing wound with a resistance coil, which would be as effective. *Emil Mayer.*

Pathology, Diagnosis and Treatment of Absolute Hysteric Deafness in Soldiers.

HURST, A. F., AND PETERS, E. A.,

Lancet, Lond., 1917—October 6.

The writers are convinced from their experience that absolute deafness associated with normal vestibular reactions should be regarded as hysterical, and when simple encouragement fails, as will generally be the case if the patient is not also dumb, an "operation" should be performed after the patient has been made to feel quite confident that it will restore his hearing. This "operation" is described as having been applied in two cases of absolute hysteric deafness without mutism, and in one of them mutism was originally present, but spontaneous recovery had occurred some months earlier in which all treatment had failed. The first patient was given enough ether to make him excited, and two small cuts were then made behind his ear; a hammer was banged on a sheet

of iron during the "operation," and the moment after the incision had been made the patient jumped off the table with his hearing restored. The other patient was unwilling at first to undergo an operation, but finally consented, as he was naturally impressed by the recovery of the first patient, who was in the same ward and had been deaf for a much longer period. The same "operation" was performed and complete recovery occurred in exactly the same way. *Emil Mayer.*

Otosclerosis.

FREDRICK, M. W.,

New York Med. Jour., 1918—CVII—153.

The writer points out the inability of cure for these patients and considers that the causal connection between otosclerosis and syphilis seems very alluring in spite of the absence of other stigmata of hereditary syphilis, the negative findings of the Wassermann test, and the fact that antisyphilitic medication is absolutely valueless. The bone changes are identical with the bone changes in syphilis. He further considers that the most important thing in otosclerosis today is the prophylactic side, and in this way we may be of real benefit to question, but those who are under suspicion of having inheritself from infancy, with antiluetics or phosphorus, is a mooted all the members of the family in which otosclerosis has shown the otosclerotic. Whether this can be extended to treating posing their bodies, as, for instance, by having them go about in bare legs and without hats in all kinds of weather. By hardening their bodies they at the same time are hardening their ears. Chilling of the surface, whether through swimming, shower baths, wetting the head, or any other cause, should be avoided, as should be all socalled colds. Automobile riding is bad; also exposure to wind and weather, as shown by the large number of severe cases of otosclerosis among country people. The idea of heredity is well spread among the laity, and the authors state that it occurs in from nine to eighty-two per cent. It should be borne in mind that the heredity need not be a direct one, but is more often a collateral one, and that a good deal of seeking is sometimes called for to discover the otosclerotic ancestor, due to the well-known

indifference of most people in these matters. Hitherto it has been thought that these cases were due to local causes in the nasopharynx, and overzealousness in removing any and everything which might lead to local inflammations and their sequelæ was the result. School inspection might help, if one could tell the instructors how to recognize the early stages of otosclerosis, but this is, so far an unknown art. The otosclerotic woman, like the tuberculous woman, should avoid pregnancy; while pregnant she, like the tuberculous woman, seems to improve very much generally, but after parturition her hearing grows decidedly worse. The outlook for the otosclerotic girl is anything but cheerful. To translate the epigram of a French author: For the girl, no marriage; for the wife, no child; for the mother, no nursing. While the mother may be willing to sacrifice her hearing for the joys of motherhood, she should remember the hereditary taint she is conveying to her child. There is one feature of otosclerosis which should make us strive to find some relief for the sufferers from this trouble, and this is that, while the people who are deaf from old adhesive processes of the middle ear or degenerative nerve changes are, as a rule, old people whose life has been lived and whose position in life has been secured; who have passed through the pleasures and disappointments of early and middle life and can afford, as the saying is, to take a back seat, the otosclerotics belong to the younger class, who are just starting out to take their places in the world's work and pleasures. Small wonder that so many of them become victims to the numerous neuroses and insomnia, when it is realized how hard it is for them to make progress in the face of the prejudice against the deaf, how many pleasures they are being deprived of, and how hard it is to conceal their infirmity.

Emil Mayer.

Symptom of Internal Ear Disease.

MYGIND, S. H.,

Ugesk. f. Laeger, Kjobenh., 1917—LXXIX—51.

The writer's patient, an elderly woman, had been having suppuration in the left ear for two months, with sudden and extreme dizziness and slight nystagmus. No other symptoms

could be elicited until the patient was given Bartels' biconvex glasses. These prevent fixation and accommodation and thus check the nystagmus movements, but they serve as a magnifying glass for the observer. The writer saw through them that both eyeballs were making small horizontal rotary movements from side to side in a regular rhythm synchronous with the pulse in the radial artery. Modifying the circulation in the labyrinth by compressing the left carotid started powerful nystagmus to the sound ear at first, and then it changed to an opposite nystagmus accompanied by great dizziness. He accepted these phenomena as indicating the existence of a fistula in the labyrinth, and that this fistula had become obstructed by granulations or other cause, the vascular tissue pulsating and thus forcing the endolymph to and fro through the ampulla. The operation confirmed this assumption in every detail, not only in this but in two other cases in which he could elicit nystagmus by pressure on the carotid artery.

Emil Mayer.

Some Observations on the Bárány Tests as Applied to Aviators.

BABCOCK, H. L.,

Boston M. & S. J., 1917—CLXXVII—840.

Besides detailing the methods of examining the vestibular apparatus as regards nystagmus, the pointing tests and falling, the author has made some observations on the effect of turning on the pulse rate. One hundred cases were thus studied.

Average pulse rate per minute before turning	78
Average pulse rate per minute after turning	87
Average pulse increase per minute	9
Lowest pulse rate per minute before turning	58
Highest pulse rate per minute before turning	108
Lowest pulse rate per minute after turning	60
Highest pules rate per minute after turning	124

In thirty cases the pulse rate increased after turning. In twelve cases there was no change. In eight cases the pulse was lower after turning. The greatest increase was from 80 to 116. The greatest decrease was from 76 to 66.

Otto M. Rott.

Gastrointestinal Sepsis, a Cause of Ménière's Symptoms.

HOVELL, M.,

Med. Press & Circ., Lond., 1917—CIV—408.

In this discussion of Ménière's symptoms, the author confines himself to those attacks of dizziness and tinnitus which occur in patients suffering from middle ear disease, and which come on without any reason being apparent, in contradistinction to the same symptoms produced by true Ménière's disease (hemorrhage in the labyrinth), as well as those due to syringing the ear; to rotation of the patient; to an extension of suppuration to the labyrinth; to an acute disease from inflammation or infective processes extending to it; to vasomotor disturbances which accompanying the menopause; or where the cause is obvious.

The manner in which gastrointestinal sepsis produces these symptoms is by the associated congestion of the pharynx and nasopharyngeal catarrh, with consequent closure and catarrh of the eustachian tubes.

Treatment is directed to the gastrointestinal tract as well as local measures to nasopharynx and eustachian tube. In addition to inflation, the author injects into the tubes through the catheter a few drops of collosol argentum, or collosol iodin, in the form of a spray. Same medicine is sprayed into the nasopharyngeal mucosa.

The author states that this method has been most successful in relieving tinnitus due to any cause, even where deafness remains. *Otto M. Rott.*

War Deafness and the Oral Method.

DE PARREL, G.,

Rev. de laryngol., etc., Paris, 1916—XXXVII—401.

As a result of the war, numerous cases of deafness are occurring among the French soldiers. For the treatment of these there have been established socalled centers of auditory reeducation. At these clinics the treatment consists of the reeducation by the oral method of Itard.

The author in an interesting article gives the early history of this method, "which was first used in the treatment of

deafmutes in the beginning of the eighteenth century." It remained for Itard, at the National Institute of Deafmutes, however, to put the method into active operation. Later it fell into disuse, and the credit of its revival is to be given to Urbantschitsch in 1888. Since that day it has been taken up with various modifications of a mechanical nature all over Europe. Recently Tillot has devised a speaking tube which presents several new and improved features. The author describes this at length and states that by means of it the oral method is capable of much more intelligence and satisfactory application.

He then discusses at some length the relation between the purely oral method and reeducation by means of the various mechanical appliances, and points out that the two are not, in spite of all that has been said to the contrary, antagonistic, but rather supplemental to each other. "The principle of all sensory reeducation is the functional awakening of a sense by its specific physiologic excitant. For the hearing it is stimulation by sound, and in particular the human voice." "The instrumental method is the perfecting and putting in practice of the oral method. It strives to supplement the human voice, which is easily fatigued, limited in its extent and impossible of being graded with exactitude in the intensity and amplitude of its vibrations." The instrumental method does not exclude the oral method. It would be a serious mistake not to make use of it. Indeed it possesses certain advantages which the oral method does not possess. The oral method teaches the deaf to hear, develops the function of auditory accommodation, awakens the faculty of attention. Both the ear and the spirit are aroused at the same time. The instrumental method, on the other hand, causes the deaf to submit to the physiologic action of the sound wave. The labyrinth is excited. The chain of ossicles is passively vibrated. Circulation is stimulated. The deaf person is compelled to hear. It is not, properly speaking, reeducation, but rather an external massage of the muscles of the ear, an auditory or respiratory gymnastic.

For the purpose of accurately describing the whole system of auditory reeducation, the author has devised the word "anacousie," which he defines as a science at once physical and physiologic, which has for its aim the arousing of the

hearing by graduated, sonorous excitation of the labyrinth, regeneration of the tissues and auditory tract by circulatory and kinetic action, the reeducation of the functions of auditory accommodation and of attention by oral exercises.

He includes in this term:

First.—Reeducation by the voice directly or transmitted by acoustic tubes, the phonograph, microphonic apparatus.

Second.—Sonorous massage by platinum plates electrically vibrated or by sirens, etc.

Third.—Auditory and respiratory gymnastic.

Fourth.—Diathermia.

Fifth.—Lip reading, etc.

He urges that undue attention should not be directed to the particular method employed; that a broad view of the subject is necessary; that much remains to be accomplished. He concludes the article by the detailed report of ten cases of loss of hearing acquired in battle. In nine of the ten cases remarkable improvement was secured by auditory reeducation. Based on the results already secured, he is exceedingly enthusiastic in regard to the benefits of all cases of war deafness.

Harris.

Contribution to the Study of Otitic Meningitis.

JACQUES, P.,

Rev. de laryngol., etc., Paris, 1915—XXXVI—233

Jacques reports two cases of cured meningitis. The first was a case of mastoiditis following scarlet fever, in which, the ninth day after operation, symptoms suggesting Gradenigo symptom complex presented themselves, especially were there paryoxysmal attacks of severe pain.

The case was regarded by the author as well nigh hopeless. Lumbar puncture was refused. Suddenly the following day the temperature dropped and the meningeal symptoms cleared up, following a profuse discharge of pus through the mastoid wound.

The second case was that of a miner, suffering from secondary infective fracture of the labyrinth. A general purulent meningitis developed, confirmed by pus demonstrated in the spinal fluid obtained by lumbar puncture. The labyrinth was

drained by the curetting of granulation tissue in the fistula, which was found present in the external semicircular canal. Following the lumbar puncture and this operation there was a prompt improvement with eventual recovery.

Jacques regards the first case as one undoubtedly of meningitis in which the recovery was due to the spontaneous drainage from the mastoid wound, and the second case as cured by prompt and thorough drainage. *Thos. J. Harris.*

Intervention of the Supraauricular Route, With the Report of a Case of Otitic Paralysis of the External Ocular Motor Nerve. Associated With Trifacial Neuralgia.

BROECKAERT,

Rev. de laryngol., etc., Paris, 1915—XXXVI—209.

The author describes at length an interesting case of otitis, giving rise to the Gradenigo symptom complex, associated with trifacial involvement, and the method of relief by means of exposure by approach through the supraauricular route. The operation is described in detail.

The author concludes, first, that in his opinion the appearance of an external ophthalmoplegia associated with involvement of the trifacial, in the course of an acute or chronic otitis media, is an indication of a lesion situated in the region of the apex of the pyramid; second, this double syndrome can depend upon an apical ostitis, which at times, however, does not exist and the cause is to be found in a localized meningitis; third, that the involvement of the Gasserian ganglion is always a grave symptom, and demands immediate opening of the mastoid, followed by radical intervention directed to the summit of the pyramid; and finally, that the simplest and safest route for uncovering the apex of the pyramid and the region of the ganglion is the supraauricular route, as devised by the author, permitting the retrogasserian neurotomy.

Thos. J. Harris.

Deafness From Injury to the Internal Ear Arising in Battle.

Got,

Rev. de laryngol., etc., Paris, 1916—XXXVII.

The author has had an opportunity of studying cases of this nature which have occurred in the army district controlled by Professor Moure. They are of two kinds: First, those due to concussion, the result of a shell explosion at a distance of from two to five meters, and second, those due to actual wounding by a ball or piece of shell.

In the first case the injury sustained is apt to be transient and soon disappears. In the latter case the injury is apt to be severe, especially when there is a fracture of the bone itself, and the result may be a complete destruction of the organ of hearing.

The author has analyzed the cases which have come under his care and finds, contrary to what might be expected, that the percentage of patients suffering from trouble with the inner ear as a result of traumatism is greater where there has been no previous involvement of a catarrhal nature of the middle ear.

The pathologic anatomy is to a large extent theoretic in the milder cases. It has to do with a concussion of the inner ear, due to the shock produced by the displacement of a mild compression of the extra- and intralabyrinthine fluid. In the more severe cases there is in all probability a hemorrhage in the cochlea and vestibule, with injury or destruction of the membrane of Corti.

The symptoms are those of deafness which has the characteristic that when once developed it has never been seen to increase in severity. There is always an abolition of bone conduction, with abolition or considerable diminution of aerial conduction. The second symptom is tinnitus, the third vertigo, which tends to disappear in time, and the fourth symptom, spontaneous nystagmus, which also is wont to gradually disappear.

The diagnosis has to be made only from hysteria or simulation. The prognosis depends upon the extent of the injury. In treatment, the author makes use of a solution of bromids

and iodids with counter irritation over the mastoid. No local treatment at all is directed toward the ear itself.

Thos. J. Harris.

Experimental and Clinical Demonstration of Sound Conduction.

MAURICE,

Rev. de laryngol., etc., Paris, 1916—XXXVII.

Maurice has constructed an ingenious model of the ear, in which the drum, ossicle and oval window, etc., are represented. With this he has been able to carry on a series of experiments to demonstrate certain interesting problems in acoustics. He has also carried out a parallel series of investigations upon the ears of the living.

His conclusions are as follows:

1. That sound vibrations which the drum membrane receives can be transmitted at times by the ear (round window), by the chain of ossicles (oval window), and by bone.

2. That rigidity of the ossicles does not perceptibly interfere with sound conduction. It prevents, on the other hand, accommodation. The articulation of the ossicles has to do only with accommodation, and in no way with the transmission of sound.

3. That spongification of the ossicles and of the labyrinthine capsule interferes with sound transmission, the amount of interference with transmission corresponding to the failure of the thickened or attenuated drum to vibrate for certain sounds. In sclerosis of the middle ear, with the drum virtually normal, deafness is due principally to bone changes.

4. That the round window plays the rôle of a valve. This rôle loses its value when there is a tympanic perforation of the drum membrane or a disappearance of the ossicles.

5. That when there is a loss of the organs of the middle ear, the rôle of the round window can be supplied by the oval window, but it is always necessary that one of the two windows should be protected against vibration.

6. That the eustachian tube serves to equalize the atmospheric pressure upon the two surfaces of the drum membrane, but it ought to be closed in order to permit good hearing. Its periodic opening should be only momentarily.

Thos. J. Harris.

II.—NOSE.

The Use of Celluloid in the Correction of Nasal Deformities.

New, G. B., Rochester, Minn.,

J. Am. M. Ass., Chicago, 1918—LXX—988.

In the five cases in man the celluloid was obtained in a block about a foot square and three-eighths inch thick, and sawed into pieces as needed by means of a "fret" saw. Several pieces, approximately what would be required, were shaped with a file before each operation, and then perforated with small holes about 1.5 millimeters in diameter by means of a drill. Pieces varying from two to four millimeters in thickness have been used; they also are boiled ten minutes for sterilization.

A curved incision extending down to the bone is made across the nose between the eyes where the bridge of a pair of glasses would rest. With small, blunt, curved eye scissors a pocket is made in the midline of the nose down to the tip. Care must be taken to keep the pocket in the midline and not to enter the nasal cavity. The piece of celluloid which will best correct the deformity is selected from those previously prepared, and if any trimming is needed, it is placed in hot water, when it may be cut with a knife as readily as cartilage; on cooling it becomes hard again. If it is necessary to curve the implant, placing it in hot water makes this possible, and it should be held in the required position until it is cooled.

After the celluloid has been shaped, it is inserted down to the tip of the nose; the wound is closed with horsehair and sealed with tincture of benzoin compound. A thin copper splint is applied externally and held in place by adhesive plaster. In all the five cases the wounds healed primarily with practically no reaction. The implants have remained in position and have given no trouble; some of them have been in place for more than a year. I have not had an opportunity to use celluloid in a flap operation, but see no reason why it could not be thus used.

The writer concludes thus:

1. It eliminates the necessity of taking an autogenous transplant.

2. It causes practically no reaction when inserted in the tissues and apparently is not affected by them.

3. It may be readily trimmed or curved when placed in hot water.

4. It remains stiff even when trimmed quite thin.

Emil Mayer.

Fibroma of the Ethmoid Region.

FOWLER, ROB'T H., New York,

Laryngoscope, St. Louis, 1917—903.

The chief complaint of this patient was obstruction in breathing. Examination revealed a polypoid mass completely occluding the right nostril. The laboratory reported, on a piece of the growth snared off, "fibroma, hard in part; round cell infiltration."

The question of malignancy arose. The patient was operated under general anesthesia, the anterior part of the growth being removed with a snare, while the posterior part was removed with adenoid forceps through the nasopharynx in two masses each about the size of a man's finger. Great shock and hemorrhage were experienced at the time of operation. As soon as the mass was removed, the hemorrhage lessened, permitting examination of the cavity before it was packed. A large part of the ethmoid cells came away with the mass, and the ethmoid cavity was left open. The pathologic report on the specimen was: "Complex growth; fibromatous infiltration of polyps with inflammatory invasion. Vessels well formed; very highly vascular, a point against its being sarcoma." Proliferation, about a month afterward, of the pieces which remained were checked by several injections of trichloracetic acid after the method of Dr. Harmon Smith, and no further treatment was used except the use of ichthyol ointment to improve the condition of the membrane, upon which huge scabs formed soon after the operation.

Previous to operation the patient's weight had been stationary, for two years at one hundred and ten pounds, but since he has gained twenty pounds and his health is excellent.

Jos. D. Heitger.

Reoperation of Incomplete Submucous Resection of the Nasal Septum.

MOSHER, G. W., Chicago.

J. Am. Med. Ass., Chicago, 1918—LXX—843.

The writer has adopted the following method, which has thus far proved perfectly satisfactory. Killian incision on the convex side, elevate the membrane as completely as possible without disturbing the part attached to the opposite membrane, incise the cartilage anterior to the old window and elevate the other membrane. The Freer knife or sharp elevator is needed, and working from within outward to the side of the first incision, cut as clearly as possible around the adherent mucosa, leaving it attached to the other mucosa, thus making a corresponding hole in the incised membrane. Complete the elevation of the membranes and finish the operation as in an uncomplicated case.

By this method of procedure, the membrane on the concave side can be kept intact almost as easily as in a typical case, while the membrane on the convex side has only the original incision and a comparatively clean incision about the adherent portion. As a consequence, there is a minimum of traumatism. Healing is little, if any, slower than in an uncomplicated case, and the final result is comparable to that of a typical primary operation. *Emil Mayer.*

New Surgical Treatment of Atrophic Rhinitis.

GRIFFIN, EDWIN A., New York.

Med. Rec., N. Y., 1917—October 27.

The nose is anesthetized in the usual way. The mucous membrane with its submucosa of the inferior turbinate is incised from the posterior tip to the anterior tip down to the bone. The membrane is now stripped downward and allowed to drop to the floor of the nose. The turbinate is then fractured toward the septum, by passing any flat long instrument, such as the ordinary blunt septal elevator, along the external surface of the bone.

The nasal cavity is then packed with strips of plain gauze saturated in albolene oil, being careful to pack both on the

external and internal surface of the turbinate, as packing the nasal cavity internal to this bone would only push back the fractured fragments into place. The nose is then treated as after any surgical procedure.

In about seven weeks we have an entirely different looking turbinate. The triangular raw surface produced by the operation fills in with granulation tissue, and the mucous membrane grows over this area. The growth of the membrane is aided by the hyperemia produced in the upper and lower segments of the turbinate by the incision.

This surgical technic is followed in the other nostril in about two or three weeks, according to the convenience of the patient.

No astringents should be employed in the dressings. Silver nitrate in five per cent solution can be used for exuberant granulations.

This method may be employed in idiopathic atrophic rhinitis, or as a reconstructive method after destruction has already resulted from infection of the sinuses, especially the ethmoidal.

This operation is not a panacea for all atrophic cases, and should not be resorted to until all evident causes for the atrophic condition have been removed. *Emil Mayer.*

Nasal Insufflation in the Diagnosis, Prognosis, and Treatment of Tuberculosis.

PAGET, OWEN, Freemantle, West Australia.

Med. Rec., N. Y., 1917—October 20.

Applications are made through glass tube bent at a right angle. One end of the tube, the end, in fact, which is passed into the nose, is drawn out to a fairly fine point. The other end is slightly flanged outward to facilitate emptying the powder into the tube. An ordinary rubber bulb syringe with a nozzle, which will fit into the large end of the glass tube.

The dose of tuberculin B. E. powder, which varies from milligram 1/20 in severe cases to milligram 1/10 in the more ordinary cases, is poured into the glass tube at the large opening. The outward turned flange has the good quality of preventing the powder from falling outside the tube. It is es-

sential that the tube be perfectly dry inside, otherwise the powder sticks and cannot be insufflated. The powder when poured into the tube naturally stops at the angle. The tube is next taken in the hand, and with care to prevent the powder falling out, the pointed end is directed into the nose. This end should be carried as high up into the nostril as can be comfortably tolerated by the patient, and a matter of great importance is that the point shall be directed toward the frontal sinus. On no account should the tube be directed backward toward the pharynx. After the tube is in place the patient is directed to hold it firmly in his hand. He must hold it firmly, as otherwise there is a danger at the moment of insufflation of the point of the tube moving, and perhaps causing pain and discomfort in the patient's nose. The glass tube in place, and firmly held by the patient, the physician inserts the nozzle of the rubber bulb syringe into the large end of the glass tube and by a quick squeeze blows the powder in the tube high up into the nose.

It seems as if the capacity of the epithelial cells to form antibodies is more highly developed in the upper regions of the nose than in the region of the lower part of the septum and the inferior turbinates. Pouring the powder into the tube, inserting the tube into the nostril, and squeezing the insufflator, takes perhaps one minute.

He has given large doses of tuberculin as insufflations, and produced severe reactions of temperature, and did not find that they produced extension of disease, and some of these cases have been carefully examined by medical men skilled in tuberculosis work. These severely reacting cases have, after the reaction passed off, done remarkably well.

When treatment commenced, the temperature level was from 99° to 101°. Treatment consisted of insufflation of milligram 1/10 on four consecutive days. The day after the last insufflation the temperature rose to 102°, and from then onward steadily fell, so that eight days after the last insufflation it was down to the 98-100° level.

With the fall in temperature there is a corresponding improvement in physical signs and general condition. Usuallly, even at the height of the curve, the patient's appetite is good, and he is taking his food freely and willingly.

For diagnosing tuberculosis he gives an insufflation of milligram 1/12 every second day for six doses. This occupies a period of roughly a fortnight. If at the end of that time, or before, the patient's temperature has definitely reacted, then it is probably a severe case. On the other hand, if the patient is definitely improved in health, with a fall of temperature to normal, then a diagnosis of tuberculosis in a mild form is made, and the insufflations as a treatment are carried on for another two to four weeks. At the end of this time the patient should, in a mild and early case, be either well or sufficiently nearly so to require only a few days' holiday. A reaction with insufflations of moderate dosage is an expression of a distinctly enfeebled resistance against the disease, and the amount of reaction is probably in direct proportion to the poverty of resisting power, and hence enables a definite prognosis to be given. *Emil Mayer.*

Tuning Fork Test for Disease of the Nasal Sinuses.

OPPIKOFER, E.,

Cor.-Bl. f. Schweiz. Aerzte, Basel—XLVII—1121.

The writer states that he was unable to confirm Glas' statements in regard to the diagnostic importance of the Weber tuning fork test applied in the diagnosis of diseases in the nasal sinuses. He applied the test to sixty-nine adults with certain sinuitis, and obtained a positive response only in four —that is, in 5.8 per cent, and the response was not decided in these. *Emil Mayer.*

A New Nasal Splint.

STEIN, OTTO J., Chicago,

J. Am. M. Ass., Chicago, 1918—LXX—224.

The general practitioner as well as the rhinologist can find use for a good intranasal splint to hold cotton or gauze in contact with the septum. The cotton can be dusted with a powder, moistened with a liquid, or impregnated with a salve, and accurately held in contact with the membranes. This is useful in the treatment of fractures of the nose, epistaxis, ulcerations, etc., and is strong and adjustable. The splint

illustrated fills all of these needs. It is readily adjustable to any degree of pressure. It is made in two parts, making it very easy of introduction. When properly placed, it allows free breathing through the nostrils. *Emil Mayer.*

Hay Fever—New Surgical Treatment.

MILLER, T. P., Knoxville,

The writer says that there is a condition in all cases of hay fever of highly sensitized parts of the mucous membrane supplied by the olfactory nerve. This is caused in all cases he has seen by a malformation of the nose. This malformation can either be an enlarged superior turbinate, a deviated septum or a very close nose. At any rate, there is a pressure between the superior turbinates and the septum, causing a highly inflamed and sensitized condition of the mucous membrane at the ramifications of the olfactory nerve. These are the patients who have hay fever. He relieves this pressure by removing the superior turbinate or by the proper application of trichloracetic acid. *Emil Mayer.*

Ozena in the Different Races of the Earth.

ROY, J. N., Montreal,

Rev. de laryngol., etc., Paris, 1915—XXXVI—238.

In the course of many voyages covering the last fifteen years, Roy has made a careful study of the various races as to ozena. He makes the interesting observation that careful examination of the native Africans does not show in a single instance a case of ozena. On the other hand, the yellow race of Asia is especially predisposed to atrophic rhinitis.

In the same race, and especially in Indians, deviation of the nasal septum was observed in fully forty per cent.

Roy feels that his clinical observation regarding the native of Africa is a convincing proof that ozena is a disease of microbic origin. *Thos. J. Harris.*

Voluminus Angioma Involving the Lateral Wall of the Nose and Cheek, of Rapid Evolution, Causing Death in a Child of Three Years.

GAREL AND PISTRE,

Rev. de Laryngol., etc., Paris, 1915—October 31.

The growth originated as the result of a fall on the nose, and made its appearance six months after the fall, in the right ala. Total extirpation was practiced, but a recurrence took place. Following this, the X-ray was employed, at first in massive doses, and for a considerable length of time. The results for a time were encouraging, and the growth became much smaller. Later it returned, causing death.

The author is of the opinion that if the electrical treatment as at first practiced had been continued, instead of weak doses for a short time, which were substituted, the growth might have been entirely conquered and the child saved.

Thos. J. Harris.

Freeing of the Mucosa by Paraffin in Operations Upon the Nasal Mucosa.

CHABERT,

Rev. de laryngol., etc., Paris, 1915—XXXVI—270.

Because of the difficulties of the submucous operation, as well as the time required for its performance and the frequent accidents of anesthesia, the author favors the method devised by Furet, of loosening the mucous membrane on the concave side, freeing it from the cartilage, which is then removed, together with the membrane on the convex side, by scissors or bistouries.

In this way there is no danger of wounding the mucosa that has been freed and which is to serve as a future septum.

He admits the objections to the operation so far as it means a removal of the mucosa on one side, with the possibilities of delayed healing. He argues, however, that the rapidity with which the operation can be performed, together with its simplicity, justify it in the hands especially of those who do not possess the requisite technic for the more difficult operation.

The elevation of the mucous membrane is secured by the injection of paraffin, which properly introduced bellies out

the mucosa. Care should be taken that as few punctures of the membranes are made as possible. The paraffin easily escapes after the cartilage has been removed. It possesses decided advantages over that of water, which has been employed for this purpose. *Thos. J. Harris.*

Frontal Sinus Operation (Lothrop) Performed Under Local Anesthesia.

BOEHRINGER, M. P.,

N. Orl. M. & S. J., 1918—LXX—721.

The report concerns a case of pansinuitis in which the Mosher ethmoid operation was performed, including removal of the middle turbinate and the anterior wall of the sphenoid. At the same time a modified Lothrop operation was performed under local anesthesia.

Anesthesia for the frontal sinus operation was obtained by injecting one dram of one-quarter per cent novocain solution beneath the skin of the left eyebrow, about one-quarter inch from its mesial margin, then deeper into the superficial tissue and finally beneath the periosteum. The supraorbital, supertrochlear and infratrochlear branches were then injected. The entire anesthesia about the frontal sinus externally was accomplished with a single skin puncture, with a two inch needle, withdrawing the needle just far enough to inject each succeeding area, but not withdrawing it entirely out of the skin.

A point of interest is that the nerve blocking was so successful that it was not found necessary to cocainize the mucous membrane of the frontal sinus before curetting.

Arthur I. Weil.

Experiment in the Use of Neosalvarsan in Ozena.

PISTRÉ,

Rev. hebd. de laryngol., etc., Paris, XXXVII—January 15.

Following the example of other investigators in employing neosalvarsan in affections other than that of syphilis, the author made use of the drug in the case of a woman of twenty-eight, suffering from pronounced ozena, where there

was a clear syphilitic history. A previous course of injections of mercury had been without any result.

In all, the author made thirteen injections of neosalvarsan in three courses of treatment. The result was exceedingly satisfactory. The patient put on weight and the condition of the nose materially improved so far as symptoms were concerned.

Thos. J. Harris.

Nasal Septum Deformity in Children.

KAEMPFER, L. G.,

Laryngoscope, 1917—XXVII—868.

The youngest child was five weeks old, the oldest seven years old. The majority of the children ranged in age from two months to four years. There were ninety-nine children in the first year of life. Forty-two under six months, and fifty-seven between six and twelve months old. Between one and two years of age there were fifty-seven children; between two and three, there were thirty-eight. From the fourth to the fifth year, there were four children, and one each in their sixth and seventh years. Of the total, there were 49 per cent of septal deformities, 20 per cent of frank deviation, and 30 per cent of septal thickenings. As an evidence that the thickened septa were but forerunners of frank deviations later on, are cited the following statistics:

In the first year the proportion of true deviation is 8 per cent, and in the fourth year 55 per cent. The thickened septa, which are 25 per cent in the first year and 45 per cent in the second, fall to 32 per cent in the third and 15 per cent in the fourth year.

Less than 5 per cent of the total cases with deviation had hypertrophied inferior turbinates. About 4 per cent had hypertrophy of the middle turbinates.

The following statistics deal with the relationship of septal deviations to hypertrophied tonsils:

Of the 108 children with septal deformity, 85 per cent had hypertrophied tonsils. Of 112 children without septal deformity, 77 per cent had hypertrophied tonsils. Of the 180 cases of hypertrophied tonsils, 53 per cent had septal deform-

ity, while of the 27 cases with small tonsils, only 18 per cent had septal deformity.

The author believes that hypertrophied tonsils and septal deformities have a common etiologic factor, and that factor seems to be the chronic rhinitis. A vicious circle is started, beginning with the narrow nose, this causing rhinitis, and this in turn increasing growth of tonsils and adenoids. The latter increase again the rhinitis which, in turn, aggravates the septal deformity. *Otto M. Rott.*

III.—PHARYNX AND MOUTH.

A Mouth Gag.

ALLPORT, FRANK, Chicago,

J. Am. Med. Ass., Chicago, 1918—LXX—768.

With the exception of the device for opening the jaws, this gag is the same as the Jennings mouth gag, except that it is perhaps a bit stronger.

Considerable time can be saved by using this gag, because with others we have to wait until the patient is absolutely relaxed before beginning to remove the tonsils, whereas with this gag the force is so strong that a mouth can be opened before complete relaxation occurs. It is made in two sizes.

Emil Mayer.

Seltzer Water to Clear the Throat.

COMBY, J.,

Bull. Soc. méd. d. hôp., Paris, 1917—XLI—31.

The writer reports that ulcerating, necrotic sore throat can be effectually cleared out by spraying with the jet from a seltzer water siphon. He lengthens the nozzle with a rubber tube ten or fifteen centimeters long, which is laid on the tongue depressor, held by the left hand. The carbonated water jet washes out the throat, to the great relief of the patient, child or adult. In a recent case of a scarlatinal ulceronecrotic angina, the final recovery of the patient, a young soldier, is attributed to this siphonage of the throat repeated several times a day. He clamored for it after the first trial. Labruhe

introduced this seltzer water spray method, and others have used it in severe anginas with constant satisfaction.

Emil Mayer.

Primary Tuberculosis of the Tonsils.

EDITORIAL NOTE.

J. Am. Med. Ass., Chicago, 1917—October 27.

In recent years the tonsils have been regarded as the portal of entry for many diseases, but it does not appear that examination of tonsils after removal has yielded much information of value in regard to their supposed relationship to disease elsewhere. Mitchell, however, has recently published some interesting observations from Edinburgh on primary tuberculosis of the faucial tonsils obtained from children with tuberculosis of the upper cervical lymph nodes, and from children with enlarged tonsils only and without evidence of tuberculosis of the cervical glands or elsewhere. In the first group were one hundred children and six adults. In no case was it possible to establish the presence of tuberculosis prior to removal and examination of the tonsils. The tonsils were rarely painful, and there was no symptoms except swelling of the upper cervical nodes, which in about one-fourth of the cases was slight, and in the rest rather extensive. On microscopic examination forty-one, or thirty-eight per cent, of the tonsils were definitely tuberculous. Animal inoculation in ninety-two cases gave twenty positive results, the bovine type of bacillus being isolated in sixteen. There were one hundred cases, all in children, in the second group with enlarged tonsils only. The cervical glands were palpable in all. Microscopically nine of these tonsils were tuberculous also, all nine giving positive results on inoculation. The type of organism in four was bovine, in two human, and in three undetermined.

The tubercles in the tonsils were situated near the deeper portions of the crypts, and also directly beneath the surface mucosa, as well as deep in the tonsil close to the capsule, the first two being the favorite locations. The position of the majority of the tuberculous foci in places within easy access of the oral cavity may be taken as suggesting infection by way of the mouth rather than by way of the blood or lymph by

backward transport. The absence of any signs of pulmonary tuberculosis in such cases as these studied by the writer may be regarded as evidence that the lesions in the tonsils are primary and not the result of infection from the sputum, and also that the cervical lymph nodes are probably secondarily infected from the tonsils. The latter conclusion would point to the necessity of removal of the tonsils in operation for removal of tuberculous cervical lymph glands. The importance of the milk supply as a source of the infection in cases of tonsillar tuberculosis is emphasized by the fact that in many instances in the series under consideration the infecting organism was of the bovine type. Indeed, the results recorded by the writer, which are of special interest because of the large number of cases in which he found tuberculosis, should stimulate to other and even more extensive studies of tonsils, removed for whatever reason, in order that their relation to tuberculous infection and possibly also to other conditions may be determined still more precisely than is the case at the present time. *Emil Mayer*

The Menace of Mouth Infections.

OSBORNE, OLIVER T.,

J. Am. Med. Ass., Chicago, 1917—October 20.

The writer considers that there is not a greater menace to health today than crowned and bridged teeth, to say nothing of imperfectly filled and dead teeth and of pyorrhea alveolaris. Infection of the tonsil and the sinuses adjacent to the nose must never be overlooked, and eradication is the only safety. From infected areas in the mouth many pathogenic organisms have been isolated, probably the most dangerous being the pneumococcus and the streptococcus viridans. In a reference to the treatment of pyorrhea alveolaris he emphasizes the fact that dentists use iodin too freely on the gums. A little pain here or a little infection there, and the gum is injured by repeated applications of iodin. He further states that one of the saddest things that can happen to a person is infection of the blood with the streptococcus viridans. In the vast majority of cases the only hope for the patient with this infection is to eradicate it from the mouth before it infects

the blood and causes malignant endocarditis. Cooperation between physician and dentist is necessary in the handling of these cases. The relation of mouth germs to arthritis deformans seems proved, hence eradication of the source of infection before the joints are affected should be the preventive treatment of today. The writer draws the following conclusions from the results of study and work with cases of mouth infections: (1) Most unexpected tolerance to pyorrhea alveolaris and to tooth infection is found. (2) Chronic invalidism may be caused by mouth infections. (3) The blood pressure may be raised or lowered by mouth infections. (4) The thyroid gland is frequently enlarged, and may hypersecrete or hyposecrete in these infections. (5) Serious disturbances of the blood, heart, kidneys, stomach, intestines, and joints are frequent from mouth infections. (6) Glycosuria can be, and perhaps true diabetes mellitus may be, caused by mouth infections. (7) Serious distant focal infections may occur from mouth infection. (8) Serious brain and nerve disturbances, as well as neuritis, may occur from mouth infection. (9) Ulcer of the stomach, pyolitis, appendicitis, and chronic colitis may be caused by pyorrhea alveolaris and mouth infection. (10) Pneumonia, especially that which follows influenza, may frequently be caused by pneumococci long carried in the patient's mouth. (11) No treatment of these conditions will be of any avail until the mouth is made clean. (12) Stock or autogenous vaccines are not very promising as to their therapeutic value, but in obstinate cases they should be tried. Therefore it is generally well to grow a culture from the infection in the mouths of these patients, that autogenous vaccines may be made and used if desired. (13) One should be very careful not to promise a cure of a distant condition, although that condition was caused by the mouth infection. However, many brilliant cures are caused by surgical eradication of infected areas. The patient should always be told that the surgical removal of the infected area in the mouth does not remove the germ localized in distant parts of the body, nor does it immediately cure an inflammation caused by these germs in a distant part, nor will it restore degenerated tissue, but it will remove the primary source of infection. (14) It should be urged that any fresh lesion of the mucous mem-

branes of the mouth is a source of danger, much as is a lesion of the skin. The efficiency of the integument in warding off disease germs has long been recognized. It should be recognized that fresh cuts, abrasions, and blistering of the mucous membrane of the mouth with iodin or other strong escharotics offer the opportunity for the absorption of germs that may be freshly received into the mouth, and more especially of germs already in the mouth. *Emil Mayer.*

Sarcoma of Tonsil—Radical Operation.

SEMKEN, GEORGE H.,

Med. Rec., N. Y., 1918—March 9.

A man forty-nine years of age, a clothier by occupation, came under observation on June 19, 1917. His family history and previous personal history were negative. He had not been subject to tonsillitis, and there was no definite etiologic factor except possibly his free use of cigars for many years. During the preceding six months he had some difficulty in swallowing and occasional pain in his throat; about one week previously he had noticed that the right tonsil was considerably enlarged. There were no other symptoms. Examination showed a walnut-sized, smooth, round mass at the site of the right tonsil, which had drawn down the faucial arch on that side, and had pushed the uvula to the left of the median line. The mass was of firm consistency, pink in color, and covered with mucous membrane except in two small areas—one near the uvula, which was gray but unbroken, and one near the anterior faucial pillar, which was dull red and seemed to be an erosion as from a tongue depressor or other instrument. The mass was well defined and showed no invasion of the surrounding tissues. The other tonsil was small and seemed normal. There were no palpable lymphatic glands in the neck. The operation was done on June 22, 1917, at the New York Skin and Cancer Hospital, under ether-colonic anesthesia. As a first step, the radical extirpation of the submental, submaxillary, digastric, and carotid lymphatic gland packets was done, and the neck wound closed with sutures, provision for drainage being made. The tonsil tumor was then removed through the mouth. Three silk traction sutures were placed—one

above the anterior faucial arch on the right side, one at the lower end of the right anterior faucial pillar, and one at the base of the tongue. The mucosa was then incised wide of the tonsil rim, and the tonsil was removed with its capsule. A piece of the uvula was included also. The bleeding was checked with Kocher hemostats and the Blunk forceps, and the entire wound was then cauterized with the Percy cautery at a dull red heat. As a final step, the tonsil cavity was packed with iodoform gauze, which was held in place by sutures passed through the anterior and posterior wound margins, and tied over the gauze. The patient's recovery from the operation was uneventful. There was a sharp febrile reaction for a few days, but the temperature soon became normal and remained so. The neck wound healed per primam. The tonsil packing was removed after twenty-four hours, and the wound in the fauces gradually closed. As cicatrization advanced, the uvula was drawn toward the right side, so that at present, with the healing process complete, the uvula lay against the right side of the fauces. A point to be emphasized in the use of the cautery in the mouth and pharynx was the necessity of preventing the entrance of smoke into the bronchi and lungs with each inspiration. This was best accomplished by the use of a small motor blower attached to a pharyngeal tube, which blew the smoke out of the mouth as soon as it was formed. *Emil Mayer.*

Operations for Harelip and Cleft Palate.

GEWIN, W. C., Birmingham, Ala.,

Med. Rec., N. Y., 1917—October 20.

It is generally conceded that the earlier in life the operation is performed the more advantageous it is for the production of good results; yet many adult patients are received and operated upon, the operation being followed by almost perfect results.

When we consider the physical discomfort of a baby afflicted with cleft palate and harelip, and his inability to obtain his nourishment properly, thus causing an undernourished condition which invites various ailments, and that, if he survives the ills of his infancy, he is confronted by lessened

physical and mental health and growth and the constant humiliation of his deformity, we have sufficient reason to advise an early operation.

The harelip should be closed in earliest infancy, and as soon after the healing of the wound as the surgeon considers advisable the palate should receive attention. It is, of course, understood that the child must be in good physical condition, as complications may occur even in the most favorable cases. There is not usually an accompanying hemorrhage, yet one of the large arteries may very easily be cut, and a most persistent leakage result. It is also very difficult to prevent the swallowing of blood, which may be followed by an alarming high temperature, most difficult to control.

It is highly desirable to keep a continuous record of each patient after he leaves the hospital, to watch the child through its growth and development, in order to determine the success of our operations, for success can be measured only by the end results. We may be able, in this way, to correct our own personal defects of procedure. *Emil Mayer.*

Radium Treatment of Cancer of the Tonsil.

LANNOIS, M., AND MOUTET.

Lyon méd., 1917—CXXVI—11.

The writers report the present condition of patients given radium treatment a year or more ago. One young man has nothing left of his tonsils, and the enlarged glands in the neck and axillæ have subsided to normal size and shape. He has been an active wage earner during the past year, but recently some enlarged glands were palpated in the inguinal region. They do not seem to be metastases but a new manifestation of the lymphadenia to which he is subject. Two other patients are at work with no indication of recurrence. In a fourth case, a woman of seventy-four years was treated for a lymphosarcoma in the left tonsil. A needle with stout thread was passed through the anterior pillar, and the platinum tube containing forty-eight milligrams of radium was drawn by the thread into the depths of the tonsil, a hole being burrowed for each end of the tube in the abnormal tonsil tissue. A small tampon of gauze was placed over it, and the

tube was left in place for nineteen hours. The dose applied was nine hundred and twelve milligram hours. Improvement was rapid, the tumor promptly subsiding, and in a month or two both tonsils had completely retrogressed. In another case the cancer in the tonsil was far advanced, but the symptoms were notably improved by implanting the radium tube in a slit made with the bistoury in the tumefied tonsil. It was left in place for twenty-four hours, and the condition was much relieved. The application was repeated later, and swallowing became less difficult, but the enlarged glands in the neck were not modified. The man is now taking a course of Roentgen treatment for them, but his condition is precarious.

Emil Mayer.

Black Tongue and Keratochromoglossitis.

LEBAR,

Ann. de dermat. et syph., Paris, 1917—July.

The writer has made numerous histologic studies of this affection with a special technic. It is an easy matter to snip off the papillary filaments and tease them out in water, clear them with immersion in potassium hydrate, etc. Viewed at low power they present no black granulations of pigment such as one would expect to see. In fact, the epithelium, hypertrophied and keratinized, does not differ essentially from that of the ordinary sabunal tongue, the habitually loaded or coated tongue. Blevgad, a Swedish investigator, arrived at the same conclusion. Under the microscope the only distinguishing mark is the greater length of the papillæ in black tongue, while the keratinization which is so well developed in the latter does not at first sight account for the black color. The use of solvents of all kinds fails to extract any coloring matter, and the blackness cannot be due to blood pigment, iron or other familiar substance. The author studied especially a patch of black tongue on a pneumonia patient, the death of whom allowed him to obtain an autopsy specimen. The histologic study was made by Professor Darier. A second specimen from a dead tuberculous patient was studied under a different technic. Inoculation tests remained negative throughout and, generally speaking, the parasitic theory,

like the pigmentation theory, is without support. The affection consists of two essential features, viz.: Elongation of the filiform papillæ with abnormal coloration of their extremities. Prolonged study appears to show that the latter is not histologically essential, or in other words black is only the extreme shade, other papillæ showing all nuances of color from black to brown, coffee and milk, pale, etc., as in ordinary hairs the shade of color is not apparent under the microscope. The changes in the mucosa indicate the presence of a glossitis, and this, with the tendency to form keratin, causes the author to coin the term keratochromoglossitis, of which black tongue and habitually coated tongue form two clinical varieties. Among the causes of this condition are local processes in the mouth, pharynx and nasopharynx, gastric and pulmonary affections, etc. Irritating chemicals used as buccal antiseptics, such as menthol and potassium chlorid, are also able to determine these conditions. Smoking can hardly be regarded as an important factor, for out of Blevgad's seventy-three patients only sixteen were smokers, and the author found but five smokers among nineteen patients. In the individual case of black tongue there may have been staining of some sort involved, but any attempt to generalize from these isolated cases must be given up. Keratin has a faint yellow hue, even under the microscope, and since black tongue doubtless represents the extreme phase of keratinization this coloration must be due to certain optical properties belonging to this substance.

Emil Mayer.

Vincent's Angina.

DEGLOS.

Lyon méd., 1918—CXXVII—1.

The writer found twenty-one cases of ulceromembranous stomatitis, Vincent's angina, among two hundred and fifty-five men with sore throat sent to his contagious diseases hospital. The men were usually young, and the onset of the angina had been insidious, but in all there was a swollen and painful gland at the angle of the jaw on the same side, and all seemed depressed and pale. The reds usually numbered less than normal, down to 3,000,000, the whites about 10,000. Bacterio-

logic examination is indispensable. The "fusospirillar" symbiosis was pure in all his cases. Good results were realized by repeated application of a ten per cent solution of methylene blue after clearing out the contents of the ulcer and swabbing with a solution of silver nitrate. In certain rebellious cases a single intravenous injection of neosalvarsan, 0.3 gram, in two or three cubic centimeters of double distilled water, led to the almost complete healing of quite deep ulcerations in from four to six days. A second injection four days after the first was followed by complete recovery in eight or nine days. Otherwise the stomatitis lasted up to several weeks in some cases, notwithstanding vigorous local treatment. *Emil Mayer.*

Improved Mouth Gag and Tongue Depressor.

MOYER, J. J., Oakland, California,

J. Am. M. Ass., Chicago, 1918—LXX—680.

This invention relates to improvements in mouth specula, and more particularly to an improved tongue depressor. Its object is to provide a tongue depressor which is instantaneously removable from the mouth gag. This tongue depressor may be adjusted for depth to suit the mouth, and has an oscillatory mounting, leaving the operator free to move the tongue depressor from side to side without affecting the adjustment of the gag or removing the depressor from its holding means. *Emil Mayer.*

Relation of Streptococci to Bovine Mastitis and Septic Sore Throat.

DAVIS, D. J., Chicago,

Am. J. Pub. Health, Boston, 1918—VIII—1.

The question of pasteurization is an interesting one in relation to these infections. In the case of several epidemics in this country, the writer says that the infected milk had been pasteurized by the "flash" method, and the evidence in all indicated quite clearly that the milk was contaminated before pasteurization. Therefore the "flash" method is inefficient. The harm it may do by giving people a sense of false security is also self-evident. In certain epidemics the milk was consumed raw. It would seem that the only safeguard against

such epidemics is efficient pasteurization, not only of the milk and cream, but also of the material entering into the manufacture of other milk products. It is a point of some importance that it is not uncommon for firms to sell pasteurized milk yet to sell cream in the raw state. The latter is even more dangerous than milk. The question as to what constitutes efficient pasteurization for streptococci is one that requires further study. It is commonly stated in the literature that pathogenic streptococci are killed at relatively low temperatures (52-54 C. for ten minutes, Sternberg). Undoubtedly for many strains this is altogether too low. The recent work of Ayres and Johnson indicated that the thermal death point of typical streptococci varies considerably, and one of twenty-two strains studied by them resisted heating for thirty minutes at 62.8 C. (145 F.), the usual temperature for pasteurization. Furthermore, their viability in milk and milk products should be carefully studied, since we know that media may exert an important effect on the resistance of organisms to heat. In the writer's work, in which ninety-eight strains of streptococci were tested, none of twenty-four pathogenic hemolytic streptococci of human origin resisted 60 C. (140 F.) for thirty minutes. Twenty of seventy-four strains of hemolytic streptococci of milk origin and having practically no virulence, resisted 68.3 C. (155 F.) for thirty minutes. The writer knows of no evidence to indicate that strains of streptococci pathogenic to man can resist the usual temperature for pasteurization (145 F. for thirty minutes).

Emil Mayer.

A Case of Accessory Tonsils.

HAGEMANN, J. A.,

Laryngoscope, St. Louis, 1917—XXVII—906.

Several weeks after a normal tonsillectomy, the patient again complaining of a sore throat, an examination revealed curvilinear fissures about five-sixteenths of an inch in length on either side of the soft palate and ranging even with the anterior pillars. A curved probe with a little manipulation disclosed the presence of a tonsillar mass about the size of a

pea in each cavity. After removal an unmistakable cavity, entirely separate from the tonsillar fossa, was in evidence.

The presence of these supplementary tonsils is of interest chiefly from an embryologic standpoint. *Arthur I. Weil.*

Stenosis of the Nasopharynx—Operation With Prosthesis.

ISAACS, H. E.,

Laryngoscope, St. Louis, 1917—XXVII—885.

The method employed to maintain the opening was by means of an appliance consisting of a pair of wire spring holders, fitted to the molar teeth on each side of the upper jaw, and joined by a bar fitting into the arch of the palate; from this bar two wires run back to the nasopharynx and support a vulcanized rubber tube, made into a form conceived to be that which the operative opening would measure. *Otto M. Rott.*

Salivary Calculus.

CARTER, W. W., New York,

Laryngoscope, St. Louis, 1917—XXVII—881.

The author details his own case and advises operation through the floor of the mouth, unless there is an external fistula or an abscess of the gland.

The technic employed in the author's case was as follows:

1. Morphin, grain ¼, atropin, grain 1/150, hypodermatically.
2. Area cocainized, superficially and deeply.
3. Patient lying on affected side with tongue protruded to opposite side.
4. Locate stone by bidigital palpation and have patient push gland forward and upward by placing thumb under angle of the jaw.
5. Tissues are fixed by means of a pair of forceps, and an incision is made down to the stone, which is then grasped with forceps and removed. Care should be taken not to injure the lingual nerve, the maxillary artery, or the facial artery.
6. Wound should be left open and frequently irrigated.

Otto M. Rott.

The Fossa of Rosenmueller From the Rhinologic Standpoint.

YANKAUER, S., New York,

Laryngoscope, St. Louis, 1917—XXVII, 861.

In the minds of most of us, disease in the fossa of Rosenmueller has been associated with ear symptoms alone, yet a study of the anatomy and physiology of this region makes it clear that the ear symptoms are often secondary to disturbance of nasal function caused by pathologic changes in this region.

The fossa is nearly an inch in depth, extending from the posterior tip of the eustachian eminence to the postpharyngeal wall, and part of the inspired air, on its way through the nasopharynx passes through this gutter. When this passage is closed by adhesions there is considerable respiratory obstruction, even if the adenoid has been removed or atrophied. This condition is cured by cutting the adhesions.

The presence of secretion in the fossa of Rosenmueller is of interest also to the rhinologist as well as to the otologist. Anteriorly the fossa is limited by the salpingonasal fold, a fold of mucous membrane which extends upward from the tubal eminence to the vault of the nasopharynx. When secretion is present in front of this fold it is, in the opinion of the author, sufficiently characteristic of disease in one of the posterior nasal sinuses as to warrant operation on the sinus, even when all other symptoms are lacking.

When the secretion is behind the salpingonasal fold it has not the same significance, especially if there are adhesions between the posterior lip and the postpharyngeal wall. In this case the fossa may be converted into a pocket in which secretions may accumulate, giving rise to a foul taste or odor and simulating sometimes sinus disease which is really not present. In these cases the symptoms clear up when the adhesions are removed.

The author is not prepared to say whether these dammed up secretions are sufficiently confined to act as a focus of systemic infection, but he suggests such a possibility.

He also mentions a case in which reflex cough was cured by cutting the adhesions of the fossa, and suggests that this

may be another of the many points of origin of nasal and laryngeal reflex neuroses. *Arthur I. Weil.*

IV.—LARYNX, TRACHEA AND ESOPHAGUS.

Acute Laryngitis With Edema of the Glottis—Report of Three Cases Requiring Intubation—Recovery.

FISCHER, LOUIS, New York,

Med. Rec., N. Y., 1918—March 30.

From a study of the three cases here described, we find all presented the same class of symptoms—rhinitis and catarrhal manifestations of the nasopharyngeal tract several days prior to the acute laryngeal stenosis. There was fever in all cases. The temperature ranged between 102° and 105°; it invariably rose two degrees after antitoxin was administered. The pulse rate was accelerated and rose from 110 to 140 in several cases. The respirations were labored and the frequency was double that of the normal child. These catarrhal symptoms were associated with a barking, rasping, or croupy cough, and in several cases with marked respiratory interference. The cyanosis of the lips and face was also manifest in the hands and fingers—a distinct circulatory disturbance. There were also marked retraction of the chest walls, overacting intercostal muscles, and accelerated and difficult breathing. The retraction at the ensiform cartilage and at the epigastrium was distressing at each inspiration.

Deductions from the symptoms just mentioned would indicate that a stenosis of the larynx was present. On palpation the epiglottis was found swollen, the larynx was thickened, hardened and infiltrated, and it was with considerable difficulty that an intubation tube adapted for the age was introduced. Such tube usually remained in the larynx two or three weeks, and was then coughed up. In one case the tube remained but four hours. In another case the child coughed up and swallowed tubes twice in one week.

Several points should be remembered in the management of laryngeal edema. Be careful not to force a tube into the larynx, even though the size may be suited to the child's age.

All cases should be given sufficient antitoxin. Do not expect

a laryngeal stenosis to improve by giving less than 5,000 to 10,000 units of antitoxin.

A laryngeal spray of 1/2,000 adrenalin chlorid, or a local application of adrenalin by means of a swab, several times a day, has a very soothing effect. One-grain doses of sodium iodid will relieve and reduce the swelling in the larynx. If the child is very anemic, five to ten drop doses of syrup of iodid of iron, three times a day after meals, is a good restorative and should be tried.

The after-treatment consisted in giving one-grain doses of thyroid extract, three times a day, for one week. This thyroid extract was given to stimulate the internal secretions and to supply the supposed deficiency of thyroid. This was followed by Basham's mixture, one dram, three times a day, after meals. To stimulate the circulation tepid tub baths followed by cold spray or shower and massage, were ordered daily. The bath and shower were given to stimulate the circulation and as a vasomotor tonic. Excellent results followed this plan of treatment, both as to the circulation and as a general restorative. *Emil Mayer.*

Paralysis of Recurrent Laryngeal Nerve Associated With Stenosis.

BROWN, GEORGE E., AND HEMPSTEAD, BERT E., Miles City, Montana,

J. Am. Med. Ass., Chicago, 1918—LXX—4.

This was a case of mitral stenosis, associated with temporary paralysis of the left recurrent nerve, during a period of mild decompensation, in which, under appropriate treatment, the left auricle decreased in size. This reduction in the size of the auricular chamber evidently released a pressure on the left recurrent nerve with restoration of its function. The case is the only one of this particular type that we have been able to find in which a diagnosis could be made early enough to allow the nerve function to return. The case illustrates the importance of a rigid investigation of every case of left laryngeal paralysis to rule out its more common causes, as no other etiology offers a better chance of relief than this particular type. *Emil Mayer.*

Esophagoscopy and Tracheobronchoscopy.

FORERO, A.,

Report. de Med. y Cirug., Bogotá, 1917—IX—1.

The writer gives the history of endoscopy and the preferable technic, remarking that general anesthesia is indispensable for children, as they are restless and cannot stand cocain; also for timid adults and in all cases in which the foreign body has induced an inflammatory reaction. Otherwise he prefers cocain alone. The loss of flexibility in the spine with advanced age renders endoscopy much more difficult, although not contraindicating it absolutely, but cachexia is an absolute contraindication, and extreme caution is indispensable with heart disease, aneurysm, pulmonary tuberculosis, emphysema, etc., and also extreme nervousness not moderated with sedatives. With cancer of the esophagus there is often spasmodic constriction above. He deplores that with foreign bodies in the air passages and esophagus there is usually so much delay before applying to the endoscopist that the difficulty of detecting and removing the foreign body is much enhanced by the resulting inflammatory reaction. The article is illustrated.

Emil Mayer.

Laryngotomy in Children.

MCCAW, JAMES F., Watertown, N. Y.,

N. York State J. M., XVIII—1918, January.

The writer reaches the following conclusions:

First—That under certain circumstances laryngotomy becomes necessary and justifiable in children. These circumstances may vary, but may be just as imperative as in the above recorded case.

Second—Although the preoperative and postoperative care is most exacting and difficult of carrying out, the mortality higher than in the direct method, this should not deter us from doing our duty when occasion demands it.

Third—The writer is not prepared to say that the functional results from the direct method are much better than a carefully performed thyrotomy.

Fourth—The arguments against it are the high mortality, the presence of an external scar, and the prolonged and exacting postoperative care, but even these should not mitigate against it where necessity demands it. *Emil Mayer.*

A Case of Blastomycosis With Laryngeal Involvement.

Downing, E. D., Woodmen, Colo.,

J. Am. Med. Ass., Chicago—1918—LXII—85.

Male, aged thirty-seven years. There was a marked hoarseness, with pain at times in the ear. On the right tonsil were two small pinpoint yellowish spots. The epiglottis was eroded in a V-shaped ulceration, the lesion extending well on the tongue. It was not swollen, enlarged or juicy, as seen in tuberculosis. The entire mucous membrane of the larynx and the cords looked as if they had been treated with silver nitrate. Closer inspection revealed many small, slightly elevated pinpoint yellow spots. There was not the appearance of extensive infiltration that is seen in tuberculous laryngitis with the same amount of involvement. A diagnosis of blastomycosis was made, and confirmed by William Ophuls in the following report:

"Sections show marked inflammatory infiltration of connective tissue and considerable proliferation of the surface epithelium. In the proliferated epithelium, several microscopic abscesses. In the inflamed connective tissue, many large multinuclear giant cells of Langhans type. In the latter and in abscesses many small spherical, budding, encapsulated parasites. Blastomycosis of larynx."

The patient was given large doses of potassium iodid daily, and his throat treated with tincture of iodin every third day. He gained a few pounds in weight, and his temperature remained about normal; but the laryngeal lesion gradually narrowed the space in the larynx to a mere slit. In February, while eating supper, he choked up. Laryngeal examination revealed both cords in contact. Very little air was entering the lungs. A tracheotomy was performed at once.

A roentgenogram at this time disclosed considerable lung involvement. Physical examination revealed an increase of dullness on the left side. Six cubic centimeters of "cyano-

cuprol," kindly furnished by Dr. Koga, were given intravenously once a week during April and May.

The temperature ran from 98.6 to 99.5 degrees, and mimicked an early tuberculosis. The patient was discharged June 2, 1917, as his condition was hopeless. The dullness in both lungs was now quite marked, but evidence of moisture was still indefinite. The roentgenogram taken at this time disclosed extensive lung involvement.

The patient returned home. The lesion in his throat finally prevented him from swallowing, and he had to be fed by a tube. He died in October, 1917. A necropsy could not be obtained. *Emil Mayer.*

Laryngeal Stenosis as a Complication of Measles.

MORRIS, M. FORD,

N. York M. J., 1917—December 15.

The writer calls most decided attention to laryngeal stenosis as a complication of measles which requires vigorous and quick attention. The symptoms are those of croupy cough, increasing dyspnea and pallor, and retraction of the epigastrium and lower intercostal spaces. A membrane may or may not be visible. It will be seen that these symptoms closely resemble those of laryngeal diphtheria. His experience with these cases has been gathered from the wards of the Willard Parker Hospital, and some of these patients enter the hospital with nose and throat cultures negative for bacillus diphtheria, while others have positive cultures; some react to the Schick introdermic test, while others do not. Morris quotes Parke, of the Department of Health Research Laboratory, as stating that "positive cultures of a diphtheroid organism and a diphtheritic looking membrane do not necessarily mean that the case is diphtheria," and also that he "does not believe that diphtheria ever occurs in a person who has a negative Schick." If the diphtheria bacillus does not cause this laryngeal condition, either the streptococcus or staphylococcus is the "root of the evil." He considers this condition of laryngeal stenosis a too frequent and a very serious complication of measles and that the onset of a croupy cough should be the signal for vigorous treatment. Intubation should be tried, even though it failed to relieve in the cases cited above.

Large doses of diphtheria antitoxin—15,000 to 30,000 units—should be given, in the writer's opinion, even in cases with a negative Schick, and in the latter cases, for the purpose of satisfaction of conscience, if nothing else. If a positive blood culture of the streptococcus or staphylococcus can be obtained, vaccine therapy, preferably autogenous, will be logical.

Emil Mayer.

Sublingual Medication.

ROBINSON, BEVERLEY, New York,

Med. Rec., N. Y., 1917—December 29.

If the hypodermic syringe be used without every precaution being employed, syphilis may be disseminated far and wide to those previously free from it, and possibly tetanus, tuberculosis, or some other fateful disease. To be entirely safe the hypodermic syringe must be sterilized, water boiled, or when used, already distilled, and the skin of the patient thoroughly cleansed with alcohol or ether.

All this takes time and implies conditions which are not available on the fighting line. It must also be remembered that on one or more occasions in practice, hypodermic injections should be repeated. How much simpler and more practical it is to order the nurse or patient to make use of a hypodermic tablet under the tongue, rather than to be forced in time of great emergency to call upon the physician to give the relief imperatively required. Here we find the great value of sublingual medication.

A small hypodermic tablet is simply powdered on paper with a penknife and poured behind the front teeth and under the tongue. In a few moments it is completely dissolved and absorbed, and very rapidly the constitutional effects of the drug employed are observed. If there be great pain, it is almost magically relieved.

Emil Mayer.

Speech Correction: A New Medical Study and a New Educational Movement.

SWIFT, WALTER B.,

Boston M. & S. J., 1917—December 6.

The writer gives a brief account of the work done under his supervision in the advancement of speech improvement,

or correction, in the laryngologic department of the Harvard Graduate School of Medicine. He has conducted graduate and undergraduate courses, and the work has been arranged under four heads: Medical, psychologic, treatment and educational. The medical courses consist in medical instruction, with special reference to speech. For example, it is shown how enlarged tonsils interfere with early speech development, how cleft palate makes speech indistinct, and how paralysis of the tongue muscles makes certain utterances impossible. The courses dealing with the psychologic aspect take up the mental functions related to speech, considering their origins and the relations of eye and ear registrations of psychologic interpretative processes and mental collaboration. Under the treatment aspect the courses take the eradication of speech defects. The courses dealing with the educational aspect cover the relationship of speech disorder to the public schools. The educational aspect includes the training of the speech nurse. He further states that the more immediate aims of the two speech clinics in Boston are, first, to show teachers how to correct speech disorder in the public schools; second, to found other speech clinics under other medical heads; third, to establish other teaching centers as affiliated branches of the original home clinics. These Boston clinics are dominated by the research problem. Every student is given an investigation. This accounts for the extraordinary productivity of the two clinics during the last few years. During last year about one hundred and twenty papers were read by Swift and his assistants, and during the year before that one hundred and ten. Yet they state that they have done nothing that others could not have done with the same training and opportunities. He tells that last year one hundred and three teachers studied the methods and systems of the clinics, and now these methods are being put into practice in the public school systems of the various cities, and classes will be formed for the correction of speech disorder under medical supervision. Physicians who have studied in these clinics have later established clinics of their own, affiliated with the home clinics, with aims of mutual aid. In carrying out the clinical method the patient's history is taken in the ordinary way, and he is given a thorough examination—physical, mental, psychiatric, psycho-

logic, and educational—before the more exhaustive examination of the functions of his speech mechanism. Then treatment is outlined and he is drilled individually or in a class. At the same time he is fitted into an investigation, and a minutely detailed record of progress is put down as data for some future use. *Emil Mayer.*

Stricture of Esophagus—Successfully Dilated From Below Upward Through Gastrotomy Opening.

ROBINSON, E. F., Kansas City,

J. Missouri M. Ass., St. Louis, 1918—XV—1.

For twenty years no solid food entered the stomach of the writer's patient and liquids only in the smallest quantities. Since birth this girl had never been able to swallow solid food. Ever since she could remember, when she would eat, the meal would be vomited about four to six hours later. For the past few months even milk would be ejected from the esophageal pouch, usually in a hard curd. A roentgenogram and the fluoroscope, after a glass of bismuth and buttermilk, showed a large esophageal pouch about two inches above the diaphragm. A faint fine shadow about the size of a small knitting needle could be traced indistinctly through a stricture into the stomach. An effort was made to pass the stricture by having her swallow fine silk threads. In order to get these down they were attached to small pieces of easily dissolved chocolate cream candy, but no success resulted from these efforts. Under ether anesthesia the abdomen was opened by a vertical incision about one inch to the left of the median line. The stomach, which was very small, was brought into the wound and an incision just large enough to admit the index finger was made low down on the anterior surface. After locating the esophageal orifice a small bougie was passed with difficulty through it up into the pouch and out through the mouth. To the bougie was attached a heavy linen thread, which was drawn out of the gastrotomy opening. A heavier silk thread was tied to this and then a double piece of obstetric tape. There was thus established two heavy ligatures through the gastrotomy opening, through the stricture, and out the mouth. The end of one of these were tied together to serve

as a safety ligature. To the other was attached a rubber drainage tube which was pulled through the stricture and the end allowed to protrude from the stomach opening. Several holes were cut in the tube to permit feeding through it. The stomach was attached to the abdominal wound and the tube was invaginated to prevent leakage from the stomach. The patient was fed through the tube for the first three days, and when the tube was removed, liquids and soft food were given by the mouth. The gastrotomy closed in ten days. The emergency or safety ligature was not removed until the tenth day, when bougies were passed by the mouth. These were continued each week for some time. Three months after operation the girl had gained thirty pounds in weight. *Emil Mayer.*

Intubation in Laryngeal Diphtheria, With Notes on Sixty-four Cases.

SHEFFIELD, HERMAN B., New York,

Med. Rec., N. Y., 1917—December 22.

The writer records intubating sixty-four children suffering from laryngeal diphtheria, with but one fatal issue. This favorable result was due to the facts, firstly, that the physicians in attendance had promptly administered ample doses of antitoxin to neutralize the diphtheritic toxin; and secondly, that they used the good judgment of inviting me to perform the operation while their patients were still in fair vitality, and not gasping for the last breath of air, as is often the case with those sent to hospitals for contagious diseases. It may be noted that all of these children remained in their own homes, often in most undesirable surroundings, and without skillful nursing. Four of them lived out of town, requiring two or three hours' journey to reach. In but one instance he was obliged to reintubate three times, and the case failed to show diphtheria bacilli after repeated laboratory examinations. In these cases, which are generally spoken of as "retained intubation tubes," we usually remedy the trouble by gradually introducing larger tubes with each reintubation and by local attention to the nose and throat. *Emil Mayer.*

Treatment of Painful Dysphagia in Tuberculous Laryngitis.

LUKENS, ROBERT McD.,

N. York Med. J., 1918—February 23.

The writer discusses this subject with special reference to nerve blocking. He says that in all cases of painful dysphagia the internal laryngeal nerve should be blocked. There are no contraindications to nerve blocking, and this procedure aids the dietetic treatment by removing or lessening disphagia sufficiently to allow the patient to eat necessary food. More rest is obtained, due to cessation of pain from the throat, and any number of injections may be made and the patient kept in constant comfort by injecting as soon as the pain occurs. Histologic examinations of injected nerves showed that the results modified the nerve trunk very little, fibrosis being usually present, and in some cases numerous spaces within the bundles of the nerve fibers. He urges the wider use of this method of treating painful dysphagia in tuberculous ulceration of the larynx, as it is a procedure which can be learned easily and practiced by the average practitioner. *Emil Mayer.*

Death From Pressure on Larynx by Extreme Anterior Curvature of Cervical Spine.

NOEHREN, ALFRED H., Buffalo, N. Y.,

J. Am. Med. Ass., Chicago, 1918—LXX—680.

Female, aged sixty-six years, for twenty years had been in fairly good health, except that she had experienced constant difficulty in swallowing. Thus she had been unable to eat her oatmeal without picking out any lumps that might be in it. She had also been markedly hunchbacked ever since she had been in the institution.

The writer saw her for the first time. the morning of January 5, 1918. During the two previous days her difficulty in swallowing had markedly increased, and for twelve hours she had been unable to swallow anything.

Only a very superficial examination was possible, as the patient was in great distress, and could not breathe except when curled up on her left side. The most obvious symptom

was her extreme dyspnea, not a rapid breathing as in pneumonia, but a labored and rather slow breathing, as though there were some obstruction in the respiratory tract.

Postmortem examination revealed the cause of the dyspnea and dysphagia. The marked kyphosis in the dorsal region caused a compensatory lordosis in the lumbar and cervical regions, the most anterior portion of the latter consisting of the third and fourth cervical vertebræ. This anterior curvature came forward directly above the larynx and the opening of the esophagus, and pressed the epiglottis down on both of them, thus practically shutting them off. It occupied so much of the usual pharyngeal space that when the finger was introduced into the mouth it felt like a large osteoma filling the mouth and pharynx. *Emil Mayer.*

Luminous Radiations in the Treatment of Laryngeal Disease. Heliotherapy and Phototherapy.

SAUPIQUET,

Rev. de laryngol. etc., Par, 1916—April 15.

The article is an exhaustive one of the physics and method of employment of natural and artificial light in the treatment of laryngal tuberculosis. The two methods of treatment are not antagonistic to one another but supplementary. The caloric rays are not therapeutically of value. Indeed, their employment may do harm.

In phototherapy we seek to suppress by the employment of appropriate filters rays of weak intensity, using only luminous rays and the ordinary ultraviolet. The "medium" and "extreme" ultraviolet rays do not penetrate the skin and are wont only to produce painful reactions. The rays of the spectrum which he makes use of both in heliotherapy and phototherapy are the rays of the "medium" portion of the spectrum, the caloric rays at one end and the ultraviolet rays at the other being cut off.

The choice of rays employed, whether heliotherapy or phototherapy, will depend largely upon the locality and requirements of the patient. Where not possible to employ the sun's rays regularly, phototherapy can be substituted. The great advantage of heliotherapy is that the patient can apply it

himself. For phototherapy the arc light is recommended with a water cooler and a quartz lens. Daily treatment of ten minutes is the usual procedure. For heliotherapy the indirect method by means of a laryngeal mirror of glass or quartz and a concave mirror of about thirty-five centimeters focal distance, suitably mounted on a base, is the simplest and best for the patient to use. Any hour in the day which best suits the convenience of the patient can be employed for the treatment. This will depend naturally upon the situation of the room and upon the condition of the sun.

Following this technic the author has been able in a great majority of his cases to obtain remarkable success. Even when a cure was not effected there has always been an amelioration of the symptom, such as cough, tickling, difficulty in swallowing, etc. It is advisable to make a preliminary application of adrenalin chlorid in order to avoid any vasodilatation which may be produced by the caloric rays, and it must not be lost sight of that undue reaction may take place. *Harris.*

Four Cases of Intubation of the Esophagus by Means of Rubber Tubes.

GUISEZ, Paris,

Rev. de laryngol., 1917—June 15.

Guisez in this article makes one of the most radical contributions to the stenosis of the esophagus that has appeared in recent times. The plan of the intubation as set forth by him is to use a short tube of such form and composition as can remain exactly in place and stay there for a considerable length of time, in that way permitting the patient to eat, otherwise impossible or almost impossible before. The new feature of the method consists in combining drainage and permanent rubber tube dilatation. The drains which the author makes use of measure from five to six centimeters in length and are of different caliber, graduated according to the Charriere system in thirds of a millimeter.

The middle portion of the drain is intended to be placed at the level of the stenosis. The upper extremity is shaped like an inverted funnel. The lower end of it contains a num-

ber of holes in the sides, placed in such a way that when the tube is introduced on the mandarin the caliber of the tube is diminished and takes the shape which permits it to glide through the stenosis without any effort.

In order to avoid the stasis which gives rise to the consecutive inflammation of the mucosa, it is wise, wherever there exists a concomitant esophagitis, to practice regular lavage of the dilatation above the stenosis. Intubation is contraindicated in all cases where acute esophagitis exists. An esophagoscopic examination must be made to determine the exact situation and caliber of the stenosis to be treated. The throat is anestheticised with a twenty per cent solution of cocain. The esophagoscopic tube should be of the proper length, short as possible, but sufficiently long to reach the seat of the stenosis. It ought to be quite large, at least fourteen millimeters in caliber, for a man, and thirteen for a woman, in order that the drain may slip into it easily.

The all-important condition for the employment of intubation is the existence of some opening in the esophageal lumen. Gradual dilatation of the stricture is to be practiced. It is a good idea to allow a bougie to remain in several hours. In this way it will be possible to finally pass a No. 20 bougie. This is left in for four to five minutes. A No. 10 drainage tube, a size below, is then selected. After having lubricated it with oil, it is thrown upon the whalebone by means of a thread of silk or catgut. One is then ready for intubation. Its introduction is very easy. A filiform bougie is then introduced to ascertain that the drain is not bent. The passage of gas or liquids from the stomach will also show that it is in proper condition. The introduction requires but a few minutes. The patient begins to drink milk and bouillon at once, and where deglutition was almost impossible he is able to swallow immediately sufficient quantity for the support of his strength.

Five or six days afterwards the drain is replaced by a larger one, and so progressively No. 28 or 30 is attained. From this time alimentation can be a little more solid, vegetables in puree and soups pass easily. A veritable resurrection of the patient takes place. He puts on weight so that many of Guisez's patients suffering with epithelioma have taken on two to three kilograms in eight days.

The statistics of his results are particularly interesting. The first rubber tube intubation was performed in September, 1913. In all he has treated forty cases of stenosis of the esophagus by this method. Twenty-eight of the cases suffered from epithelioma of the esophagus. In five of them the stenosis was complete. In one of the cases gastrostomy had been performed and radium had been applied preceding the intubation. In thirteen of the cases intubation was the only form of treatment.

Five of the cases are dead. The others are still alive and are intubated at intervals of from one to eight months. The improvement in these has been so great that, if the diagnosis of cancer of the esophagus had not been made by actual examination, followed by the microscopic findings, it would seem that the diagnosis was faulty. Five of the cases were those of cicatricial stenosis due to the swallowing of caustics. Six other cases were simply inflammatory stenosis of the region of the cardia.

The author is with reason very enthusiastic over the method and records, especially in cases of cancer of the esophagus. He explains the tolerance with which the tubes are borne to be due to their elastic resistance and to their form. Their remaining in place is explained also by their shape. Occasionally, in cases of cicatricial and inflammatory stenosis, as a result of the dilatation, the tubes may fall lower in the esophagus. It is only necessary then to draw them up a little. They rarely come out of the mouth. Occasionally, the patient will attempt to swallow food which is too large and in that way plug up the tube. By simple lavage it can be cleaned out if necessary with the aid of the esophagoscope. Recently the author has made use of the drainage tube for the application of radium. The author finally urges it as superior to gastrostomy, which he regards by no means a simple operation. *Thos. J. Harris.*

A New Procedure for the Cure of Cicatricial Stenosis of the Larynx, With Report of One Case.

JACQUES,

Rev. de laryngol., etc., Paris, 1915—XXXVI—193.

The patient was a young woman who had an almost com

plete adhesion of the soft palate to the posterior wall. The posterior pillars were lacking. To the right of the uvula a small opening existed, which permitted the introduction of a moderate sized sound. A little air could be inspired, no air expired.

For the correction, the author, after local anesthesia, introduced the galvanic cautery knife, raised to red heat, into the supratonsillar fossa on the left side, and carried it through the thick fibrous cushion into the cavity behind. A suitably curved probe, threaded with a strong linen thread, was then introduced through the opening made, and brought out through the narrow passage existing. To this was attached a rubber tube three millimeters in diameter, which was tied in the orifice and allowed to remain for a month. At the end of that time it was removed, and a permanent epidermized passage was found to exist. Through this a wire attached to an electric tonsillotome was introduced, and the tissue gradually cut through.

No reaction took place and a permanent opening was secured. The patient for three or four weeks was instructed to rub the operated surface with a glycerated tampon. At the end of a month the cicatrix was complete. The function of the nose and ear were decidedly improved.

In cases of complete stenosis, instead of an incomplete stenosis, as existed in this case, the author recommends the making of two passages into the cavity behind, and then introducing the rubber tube. He advises, also, carrying in through the nose a sound to serve as a guide to show how deeply the cautery knife should be introduced. This usually is from ten to fifteen millimeters. *Thos. J. Harris.*

Foreign Body, Piece of Bone, Wedged in the Trachea for Two Months—Removal by the External Route.

MOURE, E. J.,

Rev. de laryngol., etc., Paris, 1915—XXXVI—December 31.

Moure was able to get a clear view of the bone by the direct method, but was unable to dislodge it in spite of the exercise of considerable force. He accordingly did a tracheotomy and removed it through the tracheal wound.

The author calls attention to the remarkable fact that a piece of bone could remain in situ in the trachea for two months without giving rise to any symptoms of discomfort, much less interference with breathing, etc. This is to be explained partly by the fact that there existed an atrophic rhinitis which had extended to the trachea and made the tactile sensibility much less. The situation of the foreign body in the center explains the absence of symptoms of discomfort in breathing, etc. The form with its sharp angles accounts for its firm implantation and the inability to grasp it successfully endolaryngeally. It was, then, one of the cases where, in the author's opinion, the direct method was not applicable.

Thos. J. Harris.

Technic of the Application of Heliotherapy to the Larynx.

COLLET,

Rev. hebd. de laryngol., etc., Paris, 1915—XXXVI—222.

Ten years ago this treatment was brought forward by Collet. Since, it has been taken up by many authors. It can be employed by the direct method, or by the indirect method, either with a single refraction of the solar rays which the author has named monocatotropic insulation, or with two refractions, which he calls dicatotropic.

Direct insulation, whether through the skin or through the laryngofistula, manifestly does not enter into consideration. For the ordinary case, monocatotropic insulation is to be recommended. This can be practiced by the patient himself with an ordinary laryngoscope.

The author describes at some length a simple modification of a lounging chair which renders the employment of the method easy and practicable.

Which of the rays of the sun possess the desired healing power, is not definitely known. On that account it is desirable that they should all be conveyed to the larynx. Another question which has not been determined, is whether high altitudes with the pure air found there, alone permit of the successful application of the treatment, or whether in spite of the contaminations of the town or city, it can be successfully employed in the atmosphere of the city.

Thos. J. Harris.

V.—MISCELLANEOUS.

Salivary Calculus—Report of a Case.

CARTER, WM. W., New York,

Laryngoscope, St. Louis, 1917—881.

This interesting case report is a recital of the author's personal experience. Two years ago he was seized with a sudden stinging pain on the right side of the tongue, accompanied later with swelling of the floor of the mouth in that side, the swelling increasing rapidly on taking food, and subsiding again a short time thereafter. A small calculus was discovered obstructing the mouth of Wharton's duct. The author removed this stone, about the size of a mustard seed, himself, under cocain. His symptoms promptly disappeared, and no further symptoms were noted until February 22, 1917, when a severe pain under the angle of the right jaw appeared. This pain was burning in character and radiated toward the tip of the tongue. The submaxillary gland on that side became swollen and exquisitely tender. Upon attempting to eat, the pain became almost unbearable, and the swelling beneath the jaw increased, extending down into the neck. Di-digital palpation disclosed a calculus below and opposite the last molar tooth. A radiograph of the area verified this observation, showing a large pear-shaped calculus and just below it two smaller ones.

On February 25th, under local anesthesia, Dr. A. J. Brown removed the stones through an incision in the floor of the mouth. The largest stone was about the size of a cherry pit, the smaller ones about mustard seed size. The recovery was uneventful, except for a sympathetic involvement of the opposite submaxillary and both of the sublingual glands, which incapacitated the patient for four or five days, during which time no food could be taken. The writer comments upon the difficulty of operating through the mobile tissues of the floor of the mouth, giving some valuable points in technic of assistance to both operator and patient. The pathology of salivary calculi is well given. The author closes with a plea for early removal of salivary calculi, to prevent pain and abscess formation, with possible cellulitis, which is so dreaded in this locality. *Jos. D. Heitger.*

Data Obtained From the Observation of Five Hundred and Thirty-one Cases, With Reference to Etiology of Thyroid Hyperplasia.

EPLER, BLANCH W., Kalamazoo, Mich.,

J. Mich. M. Soc., Detroit, 1918—56.

This is a tabulated report of the examination of two thousand students of the physical education department of a normal school in Southern Michigan, in which it was noted that enlarged thyroids were present in about eighty-five per cent, the average age being nineteen years. The investigation considered the possible infectious nature, direct or indirect, of the thyroid hyperplasia. The majority of the students came from small towns and rural districts in Southern and Central Michigan, and the school conditions were thought to have no bearing upon the findings obtained.

In data obtained from five hundred girls, the character of the source of each water supply, living locality and birthplace, contagious diseases, especially tonsillitis, and a few other points are emphasized. In a series of two hundred and fifty children (boys and girls), observations were made for similar points. Too large a number of these children showed heart murmurs, the majority beginning scoliosis, and many dental caries and uncared for gums, though coming mostly from well to do families.

Among the diseases noted are contagious diseases in general: tonsillitis, enlarged glands, typhoid, diphtheria, nasal or sinus infection, pyorrhea, acute arthritis, anterior poliomyelitis and smallpox. Most of the cases had had some contagious disease—showed slight acne vulgaris and obstipation or constipation.

Students coming from other states rarely presented an enlarged thyroid and, in fact, a normal thyroid always led the author to ask from what state they came. *Jos. D. Heitger.*

Three Cases of Infection of the Upper Respiratory Tract With Staphylococcus Pyogenes Aureus, Presenting the Symptom-Complex of Acidosis.

GARDNER, L. W., Boston, Mass.,

Am. J. of M. Sc., Phila., 1918—March.

The cases are divided into two classes:

1. Uncommonly severe and frequent nasopharyngeal infections in adults which in some instances have been proved to be of influenza bacillus origin.

2. Infections in children in whom gastrointestinal symptoms have been so prominent as to divert attention from the respiratory tract.

This paper deals with the group of infections in children. There came to autopsy a small group of three cases which had shown the clinical picture of acidosis. As a result of a study of these cases the writer concludes that uncomplicated staphylococcus pyogenes aureus is capable of infecting the upper human respiratory tract with the production of severe local lesions.

In these three cases the reaction on the part of the body is not of the type usually associated with this organism—i. e., simple exudation in the immediate presence of the bacteria, but it rather resembles the general reactions seen in the acute exanthemata.

Remote reactions of this type are constant in all of these cases, and comprise changes characteristic of a severe toxemia. They occur in the lymphoid tissue in renal epithelium, in arterial walls and in the fatty tissues. Each of these lesions is associated with the production or formation of fat, and a large amount of fat is present as globules, free in the blood serum. In addition, the presence of a lipase formed in vitro by this strain of organism has been demonstrated.

Although it cannot be proved by morphologic study alone, it seems plausible to suppose that some direct relation exists between these disturbances of fat, metabolism and acetonuria.

Whether this peculiarity of reaction is due to some inherent quality of this particular strain of staphylococcus or whether it is a result of the anatomic distribution of the organism is uncertain.

That the former explanation is correct may be inferred from animal experimentation.

In the rabbit it has been possible to reproduce remote toxic reactions by means of inoculation in several different tissues, most notably the subcutaneous tissues, and the lungs, indirectly through the blood stream, with the aid of a local irritant and depression of the vagus.

These cases also illustrate the necessity for examination of the larynx, an organ often neglected by pathologists in the course of routine autopsies. This is especially important in children showing hyperplastic lymph nodes.

Emil Mayer.

Goiter.

WATSON, LEIGH F.,

N. York M. J., 1917—September 22.

The writer presents an analysis of one hundred and twenty-five cases of goiter, together with a note on the treatment. He finds that both nontoxic and toxic goiters occur later in life in nongoitrous localities than in sections where the disease is prevalent. In this group of one hundred and twenty-five patients the majority noticed increased symptoms of intoxication as the goiter became more chronic. Eighteen per cent of the mildly toxic patients become exophthalmic after an average period of five years. In exophthalmic goiter, forty-five per cent of the patients cured by quinin and urea injections gave a history of acute onset of symptoms, while fifty-four per cent had had goiter for some time previous to the exophthalmic symptoms, which were noticed at an average age of thirty-seven years. The average time elapsing before the disappearance of the goiter was five months. In toxic non-exophthalmic goiter those patients who were cured by quinin and urea injections noticed symptoms of intoxication 1.7 years before examination, at the average age of 33.5 years. The goiter disappeared within from one to twelve months, the average period being four months. The number of patients cured was highest in the group of these who came for treatment early in the disease; the portion to the degree of damage done the circulatory and nervous systems. A goiter which has disappeared under this treatment has never recurred. The majority of patients in this group were under observation for from two to four years. Quinine and urea injections were used in treating 100 of these patients; in the remaining twenty-five this treatment is not suited to all types of goiter, and unless used discreetly will be disappointing, if not disastrous. The treatment of the exophthalmic type in

young adults is most difficult, and should be attempted only under the most favorable circumstances. If the best results are to be secured hyperthyroidal patients must have at least a year of mental and physical rest after treatment.

Emil Mayer.

Rapid Method for Identification and Isolation of Meningococci From the Nasopharynx.

OLITSKY, PETER K., New York.

J. Am. Med Ass., Chicago, 1918—January 19.

There is no subject in practical bacteriology being more actively pursued than that of the identification of the meningococcus in plate cultures prepared from the nasopharyngeal mucous membrane. The method proposed employs a fluid medium which serves to eliminate other organisms resembling the meningococcus in about twelve hours and to reduce the full time required to identify the latter by at least one day.

1. The sparing of culture medium: hence more colonies from a given plate will or may be investigated.

2. The rapid growth of organisms in the small volume of medium, thus permitting the discrimination of negative and suspicious growth in about twelve hours.

3. The use of normal horse serum for enriching the medium and for the elimination of a variety of gram-negative micrococci that are subject to nonspecific agglutination. Among the latter is especially M. flavus.

4. The sharpness and rapidity of the reaction of agglutination produced by the polyvalent antimeningococcic serum with the meningococcus at the temperature of from 37 to 38 C., as employed in the usual agglutination tests with meningococci, is a great simplification, especially under conditions of army work.

5. The simultaneous yielding of pure cultures of meningococcus for stock or further study, provided all the steps have been conducted in a strictly sterile manner.

Emil Mayer.

The Value of the Face Mask and Other Measures in Prevention of Diphtheria, Meningitis, Pneumonia, Etc.

WEAVER, GEORGE H., Chicago,

J. Am. Med. Ass., 1918—LXX—76.

In recent years so much emphasis has been laid on contact infection in contagious diseases that the possibility of infection through the air at short distances has been sometimes forgotten. Infection through the air for relatively short distances—that is, within a few feet of the patient (or carrier)—is quite possible in case the specific agent is present in the secretions of the nose and throat, when forcibly thrown out in small particles in forced expiratory efforts, as in coughing, crying or sneezing.

The masks used consist of a double thickness of gauze, so shaped as to fit closely over the face, from the chin well up over the nose, and held in place by two tapes tied behind the head. A mask is never worn twice until sterilized and washed, and is always replaced by a fresh one when evidently contaminated or when it becomes moist. Little objection is made to wearing the mask, and most nurses now wear them constantly when on duty. The attacks of tonsillitis, pharyngitis and rhinitis that were relatively frequent before the masks were used also have almost disappeared in the last year.

The physicians in the hospitals always wear the gauze masks when doing intubations and taking throat cultures, and to a considerable extent when examining patients. Coincident with this use of masks there has been an absence of diphtheria or diphtheria bacillus carriers among the physicians, and only a limited amount of throat infections.

We feel that great protective usefulness resides in this mechanical measure, and think that it might be used to advantage also by persons caring for pneumonia patients.

In hospitals caring for pneumonia and epidemic meningitis, especially in those that deal with epidemic outbreaks, such as occur in military camps, gauze masks might be used with advantage by all physicians, orderlies and nurses. The importance of carriers in these diseases is apparently very great, and that those about such patients become carriers quite fre-

quently is evident when not less than 12 per cent of carriers of meningococci were said to have occurred among the personnel of a hospital in which epidemic meningitis patients were treated. The mask not only protects the healthy person from infection and from becoming a carrier, but also prevents a carrier from spreading infection to others. Masks can be used to good advantage also in households in which are patients with hiphtheria, pneumonia, scarlet fever, epidemic meningitis or other diseases spread by nasopharyngeal discharges. *Emil Mayer.*

Recent Progress in Otorhinolaryngology.

DUFOURMENTEL, L.,

Paris méd.—VII—35—177.

Among the recent advances cited is mentioned the method of maintaining respiration and giving the anesthetic through a fine canula introduced directly into the larynx by puncturing the cricothyroid membrane. Operations on the face and neck can be done then as tranquilly as if remote from the respiratory apparatus. Intratracheal intubation answers the same purpose, but this requires more complicated instruments and irritates the vocal cords. Deafness is now classed as exempting from military service when loud speaking is heard only close to the ear. When loud speaking can be heard no farther than one meter, this compels acceptance only for the auxillary military service; heard at four or five meters is the limit requirement for active service. Eleven different styles of tests for the hearing may be used. They include what is known as the cochleopalpebral reflex—that is, the involuntary winking when a sudden loud sound is heard close to the ear. This reveals simulation of deafness. The double tuning fork test is also instructive. Two tuning forks giving the same tone but with different intensity are placed at the same distance from each ear. With normal hearing the resulting unison is heard only on the side of the loudest tone. One tuning fork can be silenced to test the hearing. The simulator does not learn lip reading like the truly deaf. After a month of training he cannot read from the lips if a noise drowns what is being said. Another trick test is to tell the subject,

speaking from some little distance, to raise his hand when he hears the spoken word. Then the examiner, speaking some syllable over and over again, walks toward the subject. The simulator raises his hand as the examiner comes quite close, thus showing that he had heard the command at a distance. Lip reading seems to be the only means of relief for the truly deaf. *Emil Mayer.*

Thyroidism After Roentgen Treatment—Two Cases.

VERNING, P.,

Hosp-tid. Kobenh., 1917—LX—31—741.

The writer reports two cases, with only a few weeks' interval, in which the vascular, recently developed goiter was given Roentgen treatment, and fatal thyroidism followed. One patient was a woman of twenty-six years. The symptoms of the exophthalmic goiter became manifest two months after delivery of her first child. She had always been nervous, and two years before had had febrile articular rheumatism, with complications on the part of the heart. The thyroid was exposed to the Roentgen ray, the dose 5 H., filtered, and the exposure was repeated the next day. The circumference of the neck subsided from 36½ to 34½ in a few days, but the tremor and agitation increased to actual delirium, and the woman died fifteen days after the last exposure, a little over two months after the first signs of the exophthalmic goiter. The other patient was a housemaid of eighteen, with no pathologic antecedents except one slight attack of gastric catarrh and chlorosis. For the last year she had been easily tired and nervous, with a tendency to occasional palpitations and shortness of breath. She entered the hospital a month after she noticed that her neck had begun to enlarge a little. Two Roentgen exposures were given, with the same dose as in the other case, only with a two-day interval. Symptoms of mild thyroidism developed, as the circumference of the neck became reduced from 34 to 30.5. Later the thyroid symptoms became aggravated, and the girl died about six weeks after the exposures. A mild intercurrent infectious sore throat may have been a factor in the fatal outcome. The dosage of the rays was not above the average, but must have been excessive

for such recently developed cases. The writer summarizes in conclusion the cases he has found on record in which, under Roentgen treatment, the symptoms became aggravated. As a rule, however, this aggravation was transient, and the result on the whole was improvement. *Emil Mayer.*

Menstrual Epistaxis and Organotherapy.

BAB, H.,

München. med Wchnschr., 1917—November 6.

The writer in his first paper, in the first place recalls the facts already established by recent researches on the question of ovulation (eighteenth day), and the inhibitory action exercised by the corpues luteum on menstruation. He next shows the barrier set up against the normal menstrual flow by a hyperplastic or otherwise pathologic uterus. In these circumstances menstrual expistaxis assumes a compensative rôle. The localization of the deviation in the nasal mucosa is explained by the physiogenetic and functional relations which unite olfaction with the genital sphere. The writer develops his reasoning by resorting to numerous physiologic and clinical arguments which are too long to cite, but mention may be made of the fact reported by Fliess, namely, that dysmenorrhea can be relieved by the application of a solution of cocain to the nasal mucosa. *Emil Mayer.*

Status Lymphaticus—Death Following Tonsillectomy—Autopsy.

CARTER, WILLIAM WESLEY, New York,

Med. Rec., N. Y., 1918—January 5.

The writer reports this case because of the rarity of the disease, because of the uncertainty which surrounds its pathology, because of its grave significance in operative cases, and because the profession should be constantly reminded that there is such a condition as status lymphaticus, and that it is a menace which must be reckoned with by every operator. It is a danger, too, which, in the present state of our knowledge, cannot be forestalled and guarded against.

Emil Mayer.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of January 11, 1918.

An Atypical Case of Otorrhea for Diagnosis.

By Julius Lempert, M. D.

With the courtesy of this section, I was to report an atypical case of otorrhea for diagnosis, but while waiting for this opportunity certain changes in my patient's condition have taken place which necessitated my further intervention, thus revealing the possible cause of the condition.

History.—N. H., twenty-nine years old, came to me March 16, 1917, and gave the following history: For the last two years he suffered from attacks of excruciating pain in the left ear which could only be relieved by incision or natural rupture of the membrana tympani. This would be followed by discharge, which would last from twenty-four to forty-eight hours. These attacks would occur about every four to six weeks. Between attacks he would feel perfectly happy. His last attack was two weeks before coming to my office. Upon questioning him, he admitted to have had an otitis media purulenta chronica of the same ear about seven years ago, which would discharge at intervals for a period of about two years, without any pain of any kind except once during the onset of his otitis media purulenta acuta. At the end of two years the ear became perfectly dry and never troubled him until three years afterward, when he began to get the above describe attacks of excruciating pain, which have been going on ever since.

Examination revealed the following:

Left Ear.—Auditory canal perfectly dry. Membrana tympani of normal color but greatly retracted. No perforation visible. On testing his hearing I found that it was but slightly diminished, but not enough to attract patient's attention. The

drum membrane was not adherent; the slightest amount of inflation would bulge it outward. The eustachian tube on that side was patent.

Right Ear.—Everything normal.

Nose and Throat Examination.—Revealed a very marked deflection of his septum, hypertrophied tonsils and a chronic rhinopharyngitis.

Not having found a sufficient pathologic condition to account for patient's complaint, I decided to put him under observation and wait for an attack, meanwhile taking care of patient's rhinopharynx.

After ten months of observation, I will attempt to describe his condition as follows. He always went through the following three stages:

1. Onset.
2. Actual attack.
3. Period between attack and onset.

1. The onset began about one week before the actual attack.

Subjective Symptoms.—Fullness in the ear, increasing daily until actual attack would come, when it would reach its height.

Pathologic Findings.—Membrana tympani would begin to bulge outward gradually, and this bulging would increase from day to day until actual attack, when it would actually balloon out. The color of the membrane would change from its normal color to a dark gray and get darker from day to day until about two days before the attack, when it would be absolutely black. This change of color would not be in the membrane proper, but would be due to the color of the fluid in the middle ear, which would be pushing the membrane outward. The hearing would be slightly decreased from day to day, but it would never be decreased to a very great extent. No signs of inflammation present.

2. Actual Attack.—(1) Stage of pain. (2) Stage of discharge.

Stage of Pain.—Would always come on at night. Pain would be excruciating, cold perspiration from the forehead, and if the patient could not reach me quick enough he would get a chill and go into collapse. This pain once left without interference, lasted about eight hours, and then the membrane ruptured of its own accord. Temperature normal.

Pathologic Findings.—The tympanic membrane ballooning outward extremely, its color is absolutely black, due to the fluid behind it. No signs of inflammation present anywhere. The antrum and body of the mastoid are not tender. Hearing worse than at any time during onset, but not bad even now.

Stage of Discharge.—Which follows incision or natural rupture of tympanic membrane.

Subjective Symptoms.—Immediate and absolute relief of all pain. Patient would act as if nothing ever happened, which usually is not so with otitis media purulenta acuta.

Pathologic Findings.—On incising the membrane, one would observe that the membrane is extremely thin. Once the membrane ruptured from mere contact with a fine cotton applicator. A black discharge mixed with blood would come out under great pressure. The membrane would immediately collapse, the discharge would be copious but absolutely odorless.

Gross pathologic examination of discharge would reveal that it consists of blood and thick sticky mucus, black in color at first, then it becomes dark brown, then brown, and finally yellow. This discharge lasts from twenty-four to forty-eight hours and then the ear becomes perfectly dry.

Batceriologic examination of discharge revealed a large amount of blood cells and a mixed infection with the staphylococcus prevailing.

The membrana tympani would remain open from twenty-four to forty-eight hours, then would close completely, leaving no trace of an incision or perforation. No tenderness over antrum or mastoid at any time.

3. Period between attack and onset, from three to four weeks' duration.

Subjective Symptoms.—None.

Pathologic Findings.—Canal dry. Tympanic membrane of normal color; no sign of incision or perforation. Membrane begins to retract and does so from day to day, until it reaches an extreme degree of retraction, and remains so until about one week before the attack, when the discharge in the middle ear begins to push it outward.

During a period of eight months of observation my patient had six attacks, always going through the same stages as described above. While observing him I also tried to do what-

ever I thought advisable to bring about a cure. I removed his tonsils under local anesthesia, then did a submucous resection. I treated his nasopharynx and his eustachian tube, but all without relief to my patient. Finally I decided to seek consultation. I brought my patient over to Dr. Robert Lewis, who after a very thorough examination told me that he was at a loss to make a diagnosis. He advised an X-ray examination of the mastoid region and suggested bringing the case before the otologic section of the Academy of Medicine for diagnosis. Dr. Dixon of the New York Eye and Ear Infirmary X-rayed my patient, and reported as follows:

"I have to report in the case of N. H., that he has a well developed, perfectly normal mastoid on the right side. The left shows a diploetic tip, sinus and postsinus region, and a sclerosed looking base. There is a very suggestive looking area one centimeter in diameter just below the knee.

"The anterior lip of the sinus cuts this in half. I am inclined to think that this is a soft spot in the bone and is very suggestive of perisinus abscess."

About three weeks after my consultation with Dr. Lewis patient had another attack, and following this, during a period of three weeks, he had two more attacks, all of them the same as described above. The canal was perfectly dry and membrane perfectly healed between each attack. The increase and frequency of the attacks suggested that it takes less time now for the fluid to fill up the middle ear. No signs of inflammation present, even then. Following this occurrence I reported to Dr. Lewis, who, together with Dr. Bacon and Dr. Dixon, spoke the case over and examined the X-ray plates and unanimously advised an exploratory mastoidectomy.

Patient was admitted into the New York Eye and Ear Infirmary December 28, 1917, and operated upon the 29th, Dr. Lewis being present at the time. The mastoid base was much sclerosed, the lateral sinus was very superficial and bulging, was exposed immediately upon removing the mastoid cortex, and ran very close to the posterior canal wall. No evidence of a perisinus abscess was found. Both sinus and dura were exposed. On exposing the antrum I found a bright red fibrous mass which did not bleed very readily. I removed this mass and gave it to Dr. Dixon for pathologic examination. The

antrum was thoroughly curetted, leaving no trace of the mass; the wound was packed and closed in the usual manner. I did a simple mastoidectomy because there was no evidence of bone necrosis, and also because patient's hearing was good.

Patient was discharged from the hospital January 7, 1918, in good condition. So far not sufficient time has elapsed to be able to tell whether my patient is cured or not.

Dr. Dixon examined the specimen and reported as follows:

"I have to report on the tissue removed from the antrum of N. H., that it is in the nature of a fibroangioma, with some elements which lead us to think it may probably recur, in case it has not been entirely removed, but can hardly be regarded as a truly malignant growth. There are a number of spaces in the tissue which indicate the possibility of the presence of cholesterin crystals, which have been dissolved out during the process of the preparation of the tissue. There is a slight amount of irritation present, and also a little pigment. Dr. Weeks went over the sections with me and concurs in the above."

In concluding, I would like to review a few outstanding features of this case:

1. The excruciating character of the pain.
2. Its periodical occurrence.
3. The ease and rapidity with which the membrana tympani would heal, leaving no trace of an incision or perforation.
4. The absolute dryness of the canal between attacks and absence of all symptoms.
5. The complete absence of inflammatory signs at any time.
6. The black color of the discharge accompanied by blood and mucus.
7. The little impairment in hearing.
8. No evidence of bone necrosis.

Considering all the above outstanding facts, and not knowing the pathology of the tissue removed from the antrum at the time of operation, was I justified in just doing a simple mastoidectomy, or would a radical mastoidectomy have been preferred in this case?

DISCUSSION.

Dr. King said that he had seen the case in the infirmary and had seen Dr. Lempert operate upon the mastoid, also the

pathologic report made by Dr. Dixon. It was a very interesting case. In making the diagnosis of malignancy, however, the clinical course of the case should be considered as well as the pathologic findings. This patient gives a history of discharge from the ear for five to seven years. Malignancy of the mastoid is a very rare condition. Dr. King said that so far as he had been able to find in the literature, only about fifty cases have been reported. The patient is a well nourished man and his appearance gives no evidence of malignancy. So far as could be judged by the history of the case and the general condition of the man with the ear trouble for seven years, it does not seem to be a malignant affection.

Dr. Dench inquired in regard to the exact localization of the growth. There is a distinct type of cases due to inflammation of the geniculate ganglion, just as we have cases of trigeminal neuralgia due to inflammation of the gasserian ganglion. If the growth was at the aditus with the base attached very deeply, it would correspond to the localization of the geniculate. Of course the hemorrhage was due to the angiomatous character of the growth. Dr. Dench said that he had seen one case where there was no doubt a hemorrhage of the middle ear, only in that instance the pain was not so severe as in this case.

Dr. Heller said that one statement made by Dr. Lempert did not seem to suggest malignancy—the discharge showed a mixed infection with staphylococci predominating. This, even with the absence of all inflammatory symptoms, is not consistent with the diagnosis of malignancy.

Dr. Richards said that one or two anatomic points might be of interest in connection with Dr. Lempert's case. In examining the structure of the mastoid of a cadaver—particularly one of the pneumatic type—with a hand lens we will often find visible (to the naked eye) a plexus of vessels running from the knee of the sinus along the inner aditus wall to the tympanum. It is possible for an angioma to involve this plexus of vessels and give rise to a slowly increasing hemorrhage, with the symptoms enumerated.

In view of such a tendency, it would be interesting to know if the patient showed elsewhere any tendency to angiomatous involvement. Furthermore, it occurred to him to ask Dr. Lem-

pert whether, in examining the nose, there was not present on the triangular cartilage any evidence of marked vessel enlargement, which is sometimes seen springing from the base and running upward over the cartilage in tree-like fashion and from which branches troublesome recurrent hemorrhages take place.

DR. LEMPERT, replying to Dr. Dench's inquiry in regard to the localization of the mass, said that it was filling the entire antrum and was in the region of the semicircular canals.

Replying to Dr. Richards, he said that he had never observed any dilatation of the blood vessels of the columnar cartilage of his patient.

He would like to have an expression from the section as to whether or not he was justified in operating as he did, or whether he should have performed a radical operation.

Paper: The Radical Mastoid Operation—Indications, Technic, and Results—Presentation of Ten Operative Cases.*

BY J. MORRISETTE SMITH, M. D.

The radical mastoid operation is not accorded the recognition it deserves by the otologists of the present day. It is not indicated in all cases of chronic aural suppuration, but it is the only adequate procedure in a certain percentage of these cases.

Chronic infections, generally speaking, may be divided into three classes: (1) Those intratympanic infections with little or no involvement of the attic; (2) those cases involving not only the tympanum but the attic, antrum and, to a limited extent, the mastoid; (3) those cases involving the intratympanic, attic, antrum, and mastoid structures as well.

The cases in class one practically never need a radical operation. It may or may not be indicated in class two; but is usually indicated in class three.

The different steps of the operation require no enumeration here, but emphasis should be laid on the following points: The facial ridge must be lowered to the lowest limit of safety; the attic should be thoroughly cleaned out, especially all of the zygomatic cells; the hypertympanic space would be oblit-

*Author's abstract.

erated, the eustachian tube thoroughly cleaned out, and the tip of bone at the outer rim must be reduced. Then the space between the outer ridge and the oval and round windows must be entirely freed from cells and diseased tissue.

The object of the operation is to have the cavity cover over with the skin. The only way to accomplish this is to keep down the granulation tissue, and this can be done only by the persistent and personal care of the surgeon; upon the success here depend the results, especially the hearing.

In order to obtain a definite idea of what to expect from the radical operation, the writer took ten consecutive chronic otitic cases, performing the radical operation upon them in his clinic at the New York Polyclinic Hospital. The cases are presented so that the results obtained may be observed.

Cases 1 and 2.—Alice C., age fifteen years. Double discharge for fourteen years. Hearing before operation, C^1 (256) fork air just heard; spoken voice, two feet.

Radical Operation.—Right, September 30, 1915; left, October 30, 1915. Both ears dry in eight weeks. Postoperative hearing: Air conduction, 64 fork (C^{-1}), 5 seconds; watch, 12 inches; acoumeter, 20 feet; whisper, 20 feet; spoken voice, 35 feet. Same both ears. Hearing markedly improved.

Case 3.—Maria F., age thirty-three years. Discharge thirty-one years. Hearing very poor. Radical operation, March 2, 1916. Ear dry. Hearing: air conduction, C fork, watch, 4 inches; acoumeter, 6 feet; whisper, 6 feet; spoken voice, 15 feet. Hearing much improved.

Case 4.—Mary M., age twenty-eight years. Double discharge since infancy. Radical operation, right, May, 1916. Ear dry and hears best with operated ear. Hearing, postoperative: Air, C^{-1} (64) fork; watch, 8 inches; acoumeter, 8 feet; whisper, 8 feet; spoken voice, 18 feet. Hearing improved.

Case 5.—Marjorie C., age nineteen years. Discharge since childhood. Radical operation May, 1916. Ear dry at times; at other times slight mucoid discharge from tube. Ear dry. Hearing: Air, 64 (C^{-1}) faintly heard; watch, 8 inches; whisper, 15 feet; acoumeter, 15 feet; spoken voice, 30 feet. Hearing improved.

Case 6.—Bernard H., age eighteen years. Discharging sinus behind ear for fifteen months, following simple mastoid

at some other hospital. Operation cholesteatoma radical, June, 1916. Ear dry. Hearing: Air, C fork (128); whisper, 4 feet; acoumeter, 6 feet; watch, 6 inches. Round window visible. Hearing same as before operation.

Case 7.—Pearl W., age seventeen years. Discharge fifteen years. Hearing good. Radical operation July 20, 1916. Secondary skin graft. Ear dry. Hearing C^1 (64) fork air, several seconds; watch, 8 inches; whisper, 20 feet; acoumeter, 20 feet; spoken voice, 20 feet manumetric membrane. Hearing practically same as good ear.

Case 8.—Henry M., age eighteen years. Discharge sixteen years. Radical operation October 18, 1916. Cholesteatoma found. Hearing: C fork air, 10 seconds; watch, 4 inches; whisper, 6 feet; acoumeter, 6 feet; spoken voice, 10 feet Hearing same as before operation.

Case 9.—Sura H., age thirty-two years. Discharge fifteen years. Radical operation October 22, 1916. Ear dry. Hearing practically nil before operation; now, air, C (128), several seconds; watch, 8 inches; whisper, 15 feet; acoumeter, 12 feet; spoken voice, 25 feet. Hearing much improved.

Case 10.—Alice H., age thirty years. Discharge twenty-seven years. Radical operation November 4, 1916. Ear dry. Hearing: C fork, air, several seconds; watch, 10 inches; whisper, 15 feet; acoumeter, 15 feet; spoken voice, 25 feet. Hearing much improved.

DISCUSSION.

Dr. Fred Whiting said that those who had the opportunity to look at these cases presented by Dr. Smith must feel that he was entitled to congratulations in regard to the satisfactory outcome, and if the other twenty-five cases to which he had referred presented as good results he had reason to be proud of them.

Years ago when we began doing the radical mastoid operation consideration was directed only to the arrest of the discharge, giving little attention to what the hearing might have been before or after the operation was over. The main idea was to arrest the suppuration. In a certain proportion of cases this was done; in others, not. After having been satisfied with these results for a certain length of time, it was found that occasionally we got a better result than was antici-

pated, and then we began to estimate how we could get a considerable series of such cases.

Dr. Smith had discussed the indications for the radical operation, and there was no criticism to be offered in regard to them. Dr. Whiting said that he was in perfect accord with all that Dr. Smith had stated. His description of the steps of the technic was very complete, and one could only emphasize those steps to which attention had been directed.

There were five important stages in the operation. First, the opening of the aditus very thoroughly and the lowering of the facial ridge so as to make as wide an opening as possible between the superior and inferior pillars of the aditus—for if this is not done one will be apt to leave a focus for granulations and will have a condition which will make it difficult or impossible to insure dermatization of the antrum.

The next step of importance is the thorough cleaning out of the epitympanum, the thorough removal of the auditory plate, so that there may be no focus for the granulations, with the same treatment of the hypertympanum, and the clearing out of any cells which may run into the floor of the bony meatus.

Then thorough attention must be given to the eustachian tube, particularly with reference to the reaming out of the border. In addition to that, the careful destruction of the periosteum lining the tube. Dr. Whiting said that it has been his custom to put into the tube a cotton tipped applicator dipped in a 1/500 bichlorid solution, and to thoroughly remove whatever may remain of the mucoperiosteum as far as the isthmus.

The last step he would emphasize was the thorough curetting of the posterior border of the tympanum and promontory, particularly in the situation of the pyramid between the foot plate and the stirrup and the facial ridge. The granulations are very apt to accumulate there unless one curettes very thoroughly and watches for them closely.

As regards the after-treatment, if eternal vigilance is the price of liberty, eternal patience and saintly perseverance is the price of good hearing in a radical operation. As Dr. Smith had said, if the operator turns the case over to an assistant

he may expect, if not a failure, a very modified degree of success.

Anyone who had examined these cases would have noted how free they are from any dense masses or bands of fibrous tissue.

Dr. Smith had said very little about using the graft. Evidently he does not use it as much as some do. Dr. Whiting said that he considers the use of the graft very important. It shortens the period of after-treatment very materially, since it serves to discourage the growth of exuberant granulations, and is the means of preventing the feature which Dr. Smith had emphasized—the accumulation of granulations and bands of organized tissue in the tympanum and over the promontory. Dr. Whiting said he had nothing new to say about the use of the graft. All those present knew as much about it as he; some approve of its use, others do not, but he believes in it. Even in case it does not take well, it will form disseminated small nests of epidermis from which new epidermis spreads more rapidly than can be secured by many applications of nitrate of silver, etc. One point about the application of the graft Dr. Whiting has found of great advantage. He had been accustomed to hold it in place with pledgets of cotton, filled with one or another sort of powder, but later he found it to do better after being in position, if held by a wick of sterile gauze into the meshes of which borated vaselin has been thoroughly incorporated. When the graft is in position, he introduces a hollow canula into the tympanic cavity and holds it in position, and through this canula he feeds the wick of gauze. It gradually accumulates until the entire tympanum is filled and pressure is evenly distributed over the superior and inferior bony walls. Then a second wick is put in place and held in the same way. By this method one is not apt to dislodge or displace the graft.

Dr. Richards expressed himself as thoroughly in accord with all that Dr. Whiting had said in commenting favorably on this series of cases. There was very little to be said in criticism of the operation. It was an admirable series, and it would probably be prolonged, for in observing these cavities one could see that certain features had been attended to which will guarantee continued success.

If one considers the radical cavity as made up of two parts separated by a vertical plane dropped transversely through the facial ridge, the trouble in nearly all cases of nonhealing is found to be anterior to the plane mentioned—that is, to the part corresponding to the original tympanic cavity. The reason for this is that all operators succeed in removing the dead bone from that portion of the cavity corresponding to the main body of the mastoid; it is the anterior portion of the cavity which requires especial attention and which tests the operator's technic.

The first great step necessary for placing the radical cavity, particularly the anterior portion of the cavity from which trouble most frequently comes, is the absolute lowering of the facial ridge down to the level of the facial nerve. This is the most frequently committed grave error, and while Dr. Smith had succeeded in securing excellent results in his series, Dr. Richards felt that in several of the cases the ridge could have been lowered to a greater degree with advantage. Again, the fringe of bone corresponding to the anterior face of the facial ridge, which is usually irregular and jagged, must be removed from before backward to the vertical limits of the facial nerve in order, first, to secure the maximum width to the apex of the cavity, and second, to expose to attack the cells of the posterior inner tympanic wall and those of the hypertympanum.

A very important step in the operation is to lower the floor of the bony auditory canal so that the floor of the hypertympanum and the floor of the canal are in the same plane. The hypertympanum is then represented by no pit, and until its external wall is removed the hypertympanum itself is not accessible to attack.

A third step in the operation which is of extreme advantage is the shaving down of the convexity of the anterior wall of the bony auditory canal. This accomplishes several things: First, it widens the anteroposterior diameter of the apex of the cavity and prevents an epithelial septum from later pigeonholing the apex from the main body of the cavity. This is an unfortunate and very common occurrence. This unfavorable condition is averted by carrying out the three steps just mentioned. A second advantage gained by removing the

canal convexity is that we secure a splendid view of the region of the tube and therefore do not have to make an unnecessarily large cartilaginous meatus to enable us to see the tube.

A fourth step, which every operator appreciates the necessity of, is the removal of the tip of bone overhanging the mouth of the tube. In addition to this, it has been his practice to evulse the tensor tympani muscle so as to enlarge the tube opening and permit a thorough view and curetting of it. It is surprising to what a depth, under these conditions, one can look into the tube.

One point that had impressed Dr. Richards in this series of cases presented by Dr. Smith was that the cavities were remarkably smooth, even so late after the operation. It is quite common, months after the operation, to see irregularities of contour appearing, due to the protrusion of epithelial septæ (out) into the cavity. They jut from any ridge-like irregularity of the bone. This could mean but one thing—that is, that the bone cavities in these cases were rendered remarkably smoot at the time of operation. This is a very important point; because upon the smoothness of the cavity depends somewhat the thickness of the granulation bed which eventually lines it, and upon the thickness of the blanketing membrane depends, to a great degree, the hearing.

Dr. Richards said that it had been his practice not to graft radical cavities until after a granulation layer had begun to spring up from the cavity. The portion of the cavity which he was particularly anxious to epidermatize early was the facial ridge and inner tympanic wall in the region of the windows.

This demonstration of Dr. Smith's illustrated what may be expected from the radical operation when properly done. in conserving the hearing, and Dr. Smith was to be congratulated upon the excellence of his results.

Dr. Dench said that he had been greatly interested in the cases shown. The results were certainly most gratifying. especially in regard to the hearing. As a matter of fact, he himself was one of the first to contend that the radical operation, instead of being a menace to the hearing, was in many instances a conservative measure. In some cases where he has operated upon a double otitis, the hearing in the poorer

ear was so much improved that the patient urged that the better ear be operated upon in the hope that the hearing would be still more improved. That is the best proof one could have that the radical operation, instead of being a menace to the hearing, offers great promise of improvement. He has seen this demonstrated so many times that he has no hesitation in operating upon cases of double otitis, and in no instance has he been disappointed. Though the hearing is not always improved, yet one can accept the rule that he laid down at the International Otological Congress in Bordeaux in 1904 in regard to these conditions: that we have three groups of cases to consider. First, those where the hearing was very good before operation. There, the hearing will probably be somewhat impaired. If the patient heard a low whisper before, he will probably hear much better after operation, unless the heard it before at twenty feet, he will probably not hear it so well afterward; if at ten feet before, he will probably hear about the same or somewhat better; if at less than ten feet, he will probably not hear it quite so well afterward. If he tuning fork shows some involvement of the perception mechanism. The case must be investigated to ascertain whether the lesion is confined entirely to the conducting mechanism. If this is the fact, there will be an improved hearing following the operation.

Dr. Dench said that he objected to one or two of Dr. Smith's statements. First, that chronic suppurative cases with free drainage will be perfectly safe without operation. They are not safe. An attic that is not diseased is not always a safe condition. Very early in his practice he had a case that taught him that. The patient had a large kidney-shaped perforation; the inner wall was not thickened, and it was not dermatized. When asked whether or not the case should be operated, he expressed the opinion that there was no danger of an intracranial condition and that operation was not demanded. A little later the man died of meningitis. The mere fact that there is a large perforation will not prevent infection from traveling up. Any purulent otitis is a dangerous condition. It is more dangerous, as Dr. Smith said, when the vault of the tympanum is involved. A process in the lower part is

more apt to drain, but it may easily extend upward into the vault.

Another point to which Dr. Dench objected was the term panotitis. It might perhaps be called a pantympanitis, for the mastoid and middle ear are practically the same thing, one being merely the prolongation of the other.

Dr. Dench said he was glad to hear Dr. Richards refer to a point which he himself had hesitated to speak of. Dr. Smith had spoken of obliterating the posttympanic cells and completely lowering the facial ridge, but this had not been done in all the cases presented. However, whether or not the ridge was lowered sufficiently, these patients did hear. So far as hearing was concerned, the results were magnificent, and there was reason to be proud of them. Doubtless in future work Dr. Smith would take off the anterior portion of the ridge and more thoroughly expose the cavity.

In regard to grafting, Dr. Dench said that he had always been an advocate of the primary graft in middle ear suppuration, and believes that if the procedure is properly carried out better results will be obtained than if the cavity is allowed to heal by the slow process. Dr. Smith spoke of his cases getting well in eight to ten weeks, but Dr. Dench could not recall a case in his private or hospital practice where the suppuration had continued for that length of time. In fact, he had sent many patients home after three weeks for a radical operation, and had sent a number home after two weeks.

Dr. Dench said that Dr. Whiting had spoken of putting in two or three grafts in the tympanic cavity, but he could see no reason for that. As a matter of fact, he had cut a graft from a child three years of age, and carried the skin out on the posterior surface of the mastoid, as he had described before the Otological Society three years ago, so that one graft covered the entire radical cavity and the margin of the meatus. The great secret of the application of the graft was brought out by Ballance, who described the use of the pipette in removing the air under the graft. Make a graft that is intact throughout, apply it to the margin of the newly formed radical cavity, and withdraw the air from beneath it with a pipette. It will go way down into the eustachian tube, and the whole cavity will be smoothly and evenly covered. It does not make

any difference how it is held in position—whether by aristol pledgets, a little gauze, etc.—so long as it is kept in perfect approximation, but it is essential to get out all the air and to have all the surface smooth. To do the radical operation successfully, one must go into healthy tissue throughout, and he had never been troubled by sequestra forming. If you are a careful operator, you will do your last case better than your first. It is simply a question of going over your technic time and time again, until you are more nearly perfect.

Dr. Dench agreed with what had been said about clearing out the eustachian tube so that you can see into it thoroughly, and then if you use the primary graft properly it goes right down and closes it; or you may take a little chip of bone and put that in to close the tube.

The appearance of granulation tissue during the period of convalescence depends on what sort of cavity has been made: If you have a perfectly smooth cavity, you will have very little granulation tissue. If you use escharotics you will have granulations. If you simply clean the cavity it will do better than if you keep on packing and using silver nitrate, etc. In very few cases of late has he used escharotics over the tympanic wall, and uses very little curetting. If the facial ridge is lowered to the limit, the anterior portion of the spur removed, and any granulation tissue removed that may be there and near the ossicles, you will have very few granulations. If this is scraped out, the promontory stands out fairly clear. If the curette is run over the region lightly you will have the ideal thin membrane for covering.

Nothing had been said about the size of the meatus. That was a very important point. Dr. Dench said that he has operated upon a great many cases, and in a very large proportion of them he has found that the cause of failure was that the external auditory meatus was not wide enough to ventilate the cavity. First, it depends on the size of the cavity which is to be aerated, and then it depends on the condition of that cavity at the time of operation. With a case that is fairly clean, a smaller meatus is required than in a case with extensive disease of the bone.

Dr. Smith, closing the discussion, referred first to the question of the skin graft and said that he had not done a

great many of these grafts, although he thoroughly approves of them. He does not believe in employing them when the dura is exposed, for he feels that there is a certain amount of danger to the patient from meningitis when skin is put into a cavity that has dura exposed; in other cases it shortens the convalescence. A smooth, regular cavity is of course very important.

The criticism made in regard to the facial ridge was perfectly justified. These cases could have had the ridge lowered a little more thoroughly than was done, but he was endeavoring to get good results and to have both sides of the face remain as nearly the same as possible.

In regard to the point made by Dr. Dench concerning cases of chronic suppuration with a large perforation, he had stated in the paper that these cases require careful study. Not all of them require operation, but all of the points must be carefull studied together before deciding that it is necessary to operate. The mere presence of a discharge does not necessarily demand a radical operation. Some of these cases will get well without radical operation. Dr. Dench was correct in regard to the term panotitis. It is a misnomer, since we are presupposing an intact internal ear.

Referring to what had been said about the eustachian tube, Dr. Smith said that he had stated in the paper that he endeavored to clean out all of the mucous membrane and granulations, also to remove the rim of bone in the outer wall. Dr. Dench's point in regard to the external auditory meatus was well taken. A good opening helps to produce a dry cavity, and there will be less trouble with a large opening. In these cases the flaps could have been larger and would doubtless have helped in the after-treatment.

As Dr. Whiting had said, it requires a great deal of time and patience to prevent the formation of granulations in these cases; therefore it is wise to make a large cavity and remove as much bony tissue as is safe and desirable, for a good clean cavity is more likely to dermatize and dry up quickly.

Dr. Richards made a good point in saying that the time in which the healing is secured had much to do with the thick-

ness of the membrane. The longer the time, the thicker will be the membrane. The primary graft shortens the time of healing and is advisable when there is no exposure of the dura.

THE NEW YORK ACADEMY OF MEDICINE.
SECTION ON OTOLOGY.

Meeting of February 8, 1918.

Thrombosis of Sinus and Jugular Complicated by Empyema of Both Maxillary Sinuses.

By H. Beattie Brown, M. D.

J. S., age thirteen years. Color, white. Admitted to the hospital on December 3, 1917. Diagnosis, double antritis. Patient came into the hospital complaining of pain over both antra. X-ray showed cloudiness in both antra, more marked on the right. A double radical operation (Caldwell-Luc) was performed by Dr. Harris on December 4th, at which both antra were found to be very much diseased. (Urine report on December 4th, previous to the operation, showed it to be acid, amber, with heavy trace of albumin, no sugar; sediment contained many pus casts.)

On December 7th packing was removed from the antra, and irrigations of normal sterile saline solution once daily were begun.

By the 10th of December the urine was free from albumin. The temperature during the convalescence always remained high, varying from 100.6 to 103.4.

On the night of December 14th the patient complained of pain in the left ear, examination of which disclosed a bulging in the posterosuperior quadrant. Myringotomy was performed and irrigations of normal saline were ordered to be given every two hours (two quarts each time). The return of each irrigation was usually cloudy. There was slight tenderness over the mastoid, particularly at the tip. His temperature still remained between 100.5 and 103.4.

December 16th. At this time the antra seemed to be almost cleared up. On December 17th I was asked to see the patient and found his left ear discharging profusely, with a moderate degree of tenderness over the entire mastoid. An X-ray was taken of the mastoid, the report from which was negative for mastoiditis. Disregarding this report, however, I decided to open the mastoid, which was done on December 19th. At the

time of the operation patient's temperature was 103.6. The mastoid was found to be completely full of pus; the bony covering of the sinus did not appear healthful, and when it was removed the sinus was found completely collapsed from just below the knee to the point of junction of the sinus with the jugular bulb. The sinus was covered with granulations throughout the entire area of exposure. The sinus was then opened and curetted as far down as the bulb. An organized clot was first removed and then several pieces of thrombus of irregular shape measuring about a quarter of an inch each way and a sixteenth of an inch in thickness were removed, but as very slight hemorrhage followed, the neck was prepared for the removal of the jugular vein. The ordinary operation was done, making an incision from the tip of the mastoid to the clavicle below, the vein ligated at the lower end under the clavicle, then dissected up to a point above the facial, where it was ligated and the vein removed. The thrombus in the vein could be seen before ligation as far down as the junction of the lower and upper half of the vein. A cigarette drain was placed in the wound throughout its entire extent, the wound closed with interrupted silkworm gut sutures and the whole put up in a wet saline dressing. Before leaving the operating room the patient was given an infusion of five hundred cubic centimeters normal saline on account of his very poor pulse.

December 20th. The patient was put on strichnia 1/60 every three hours, and a murphy drip given continuously. Temperature dropped to 98.8.

December 21st. Temperature ran to 105.6, and on the 22nd it reached the high limit of 107. At this time pulse was 138 and respirations 28. The patient was given digalen, 15 min., alternating with camphor, grains 2, every two hours. An infusion of four hundred cubic centimeters was also given.

December 23rd. Temperature, 106; pulse, 140; respirations, 22. The same stimulation was given and infusion of four hundred cubic centimeters normal saline.

December 24th. Temperature, 100.6. Digalen stopped; camphor increased, 6 grains every three hours. Infusion three hundred cubic centimeters normal saline given.

December 25th. Infusion three hundred and fifty cubic centimeters normal saline given. Temperature, 105.4; pulse, 140; respirations, 22.

December 26th. Temperature, 102; pulse, 122; respirations, 24. Patient appeared to be somewhat irrational in his talk. From the date of operation, December 19th, until this date, December 26th, the neck wound was dressed every day. The cigarette drain being shortened about an inch at each dressing, and on this date, December 26th, the last inch of drain was removed and the sutures also were removed, the entire line of incision having healed by primary union. I have said nothing about the mastoid wound, because everything pertaining to this followed the usual method.

On December 27th, temperature was 100, and from that date continued each day to approach the normal, until the 11th day of January it was 98.4.

On January 18th the patient was discharged cured.

I desire to give due credit and thanks to the house surgeon, Dr. Cosby, who virtually took charge of the case after the first dressing.

Laboratory Reports.—Blood, December 13, 1917: Leucocytes, 11,050; polynuclears, 60 per cent; lymphocytes, 31 per cent. Blood, December 17, 1917: Leucocytes, 11,300; polynuclears, 80 per cent; lymphocytes, 20 per cent.

December 18, 1917. Widal negative.

December 19, 1917. Culture taken at time of mastoid operation showed straight streptococcus infection.

DISCUSSION.

DR. ALFRED KAHN asked if he was correct in understanding that after the jugular operation the temperature went up to 105 or higher. Such a high temperature remaining after a jugular operation usually would cause one to think of further complication, other infection, probably in the sinus towards the torcular, and one might be inclined to seek such a complication.

The case is interesting and illustrative in that in this instance recovery took place without interruption, showing that a high temperature in blood vessel cases does not always indicate operative interference.

DR. TALBOT CHAMBERS said that the temperature of 105, 106 and 107 was a most extraordinary record, and he congratulated the doctor on the recovery of the patient.

DR. CARTER asked how long the empyema of the antra had existed before the radical operation.

DR. GATEWOOD, the house surgeon, to whom Dr. Brown referred the inquiry, said that it was a chronic antrum condition when the man came to the hospital. At the hospital he was under observation for about a month before operation.

DR. CARTER said that he made the inquiry because it is generally conceded that it is inadvisable to do a radical operation on an acute antrum. There probably was a connection between the radical operation on the antrum and the development of the otitic condition. In his opinion the majority of infected antra can be cured by irrigation, and every case should be given a fair chance with this treatment.

DR. GUTTMAN said that we often hear of positive X-ray findings where no other clinical symptoms but the X-ray plate give the indication for operation, and the operation confirmed the diagnosis of the X-ray plate. In this case the skiagram showed a negative result, and at the time of operation the Doctor found the antrum full of pus. This was the first instance he had heard of where the X-ray was inconclusive, inasmuch as the negative X-ray plate was contradicted by the positive finding.

DR. LEWALD asked if the radiographic evidence was absolutely inconclusive, and then cited a case where the plate led to a controversy, and it was found that a mistake had been made and the plate was supposed to represent a particular individual and did not. Was it certain that no such mistake had been made in this instance? He then told of a case recently presented at one of the section meetings where the radiographic finding of a pin was not confirmed, and a few days later the child passed the pin. The X-ray examination had not included the region where the pin had lodged. The evidence ought to be absolute before this is accepted as a negative radiographic finding.

DR. ALFRED KAHN said that he did not understand where the association came in between the antrum of Highmore and

the jugular condition. He could not interpret how the infection in the antrum of Highmore was related to the jugular.

Dr. Brown, replying to Dr. Kahn's question, said that one of the former speakers had referred to the same point: the connection between the mastoid and the antrum condition. This boy had both antra filled with pus, and the condition had been going on for a long time, possibly more than two months. The boy was septic from head to foot. In Dr. Brown's opinion, there was very evident association between the condition of the antrum and the ear. Just how the connection occurred he could not say, but it was through the system in some way—as sure as could be—a general septicemia, ending with a mastoid and a jugular thrombosis.

Replying to the remarks by Dr. Guttman and Dr. Lewald in regard to the radiographic findings, Dr. Brown said that he had not had a large experience, like Dr. Kerrison and others present, but that he had seen a good many, and he knew of five other cases where the radiograph was at fault, this one making the sixth. He was satisfied that the radiographer who did this work was an experienced, thorough and perfectly reliable person, and this man sent down a report of a positively negative condition, so far as the mastoid was concerned.

Dr. Scruton had emphasized the matter of the bleeding and the cleaning out of the sinuses. Dr. Brown said he had not gone into that detail in the short history presented, but he had never seen a case of jugular thrombosis in which there was so much clot. In the first place, he opened the sinus from the knee down to the bulb, then curetted and lifted out a clot three-quarters of an inch long by one-eighth of an inch thick, organized, but soft. After that, with the curette, he lifted out of the bulb nine pieces of the thrombotic material he had spoken of, which looked like cartilage. What it was he could not say. While he did not cut away the walls of the sinus thoroughly, he did everything else and had the sinus absolutely clean. Dr. Scruton had made a good point when he spoke of the importance of early dressings. The wound should be dressed the next day after operation and every day thereafter.

Paper: Report of Cases of Deafness of Uncertain Origin, Greatly Benefited by Antispecific Medication.*

By George E. Davis, M. D.

DISCUSSION.

Dr. Talbot Chambers inquired if Dr. Davis thought syphilis was the cause of the deafness in the second case, why did he not give the patient antisyphilitic treatment.

Dr. Davis said that he had submitted the case for discussion as to diagnosis, but as it was a very recent case, he had not yet instituted antisyphilitic treatment, as the patient was from the country and had not returned since the positive Wassermann report. However, this would be administered as early as possible. The first patient was given mercury, etc., with very decided improvement in the hearing.

Dr. Guttman asked if he was correct in understanding that Dr. Davis ascribed the conditions described in the third case as being due to the hypertrophy of the thyroid.

Dr. Davis replied that he considered that the patient was suffering from a toxic condition. The cases were simply presented for discussion in regard to the diagnosis, not for treatment, btu to illustrate the importance of the knowledge of functional tests in the diagnosis and treatment of deafness. The first patient had been treated for eighteen months for middle ear catarrh, but had never received a functional test. The test showing shortened bone conduction had suggested the diagnosis to him, and notwithstanding the negative or feebly positive Wassermann report, he went ahead and gave antisyphilitic treatment, and the patient's hearing was decidedly improved. The last case was cited to show that these patients sometimes go to a general practitioner complaining of vertigo alone, and frequently the cause is a very difficult matter to diagnose. A careful functional test of the ears in this case did not disclose any local trouble that would account for the vertigo. There was no disturbance of the static part of the ear, but the patient had thyroid enlargement which would account for the vertigo and heart condition. The vertigo was only momentary, and examination would probably

*See page 233.

eliminate syphilis entirely, although no Wassermann had yet been made. The fact that she had a large thyroid suggested the possibility that the condition was merely toxic. We know that can arise from many conditions; we have thyroid toxemia, luetic, arsenic, etc. If one does not make an accurate diagnosis and treat the cause of the condition, you will not have very good therapeutic results.

Paper: The Examination of Applicants for the Aviation Service of the United States Army—Disqualifying Factors in Fifteen Hundred Cases—Some Observations of Past-Pointing After Rotation.*

By Capt. W. A. Scruton, M. R. C.

DISCUSSION.

Dr. Kerrison, referring to Dr. Scruton's observation that failures in test-pointing were due to a faulty position of the head, asked him to explain just what was meant.

Dr. Talbot Chambers asked if X-ray pictures were made of the tooth roots.

Dr. Scruton replied in the negative, and said further, that the requirements for the teeth were rather indefinite. They call for four sound teeth for grinding purposes, two above and two below, so that they are opposite—all the other teeth can be out, apparently. Men with good bridge work are accepted.

Replying to another question in regard to the manner of testing the men, Dr. Scruton said that they use a card with ten pictures on it—a tower, battleship, cruisers, etc.—and the man is told to focus the apparatus by starting beyond focus and gradually come into focus; suddenly the items in the picture stand out before him, and they look as though they were hung in space; every picture appears at a different distance from the eye; it is not the size of the picture that enters into the question, but the distance. The apparatus used for this test is called the stereoscope. A number of the men came back for tests on the stereoscope and got in all right

In regard to the test for colors, it would be difficult to fool the examiner on that, for the Jennings card which is used can-

not easily be memorized. Some of the men claim that they are paint mixers—if they call colors according to their ideas they are likely to be wrong.

Replying to Dr. Kerrison's inquiry about past-pointing, Dr. Scruton said that when a man was put in the chair and turned, if his head was not in the right position the results would be inconclusive. As soon as the chair is swung the man's head may go to one side or the other. Jones' chair is not good, but it is the best obtainable. An attempt has been made to so modify it that the head is held in position, but the plan proved impracticable.

Dr. Scruton also explained the importance of having the pointing done at the proper height. This test is often made with the hands of the tester held too high.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Meeting of December 18, 1917.

DR. STANTON A. FRIEDBERG, THE PRESIDENT, IN THE CHAIR.

Dentigerous Cyst.

DR. JOSEPH BECK exhibited the patient, shown at the last meeting. He had operated since that time and found a cyst with teeth in it. It was easily peeled out without entering the antrum. The cavity was lightly drilled with a bur, and subsequently bone wax was packed in fairly tight. The anterior surface of the superior maxilla was wired to the alveolus, and two or three silk sutures were introduced. The wax came out gradually, but suddenly a large piece was expelled, and at this time the cavity was only half filled with granulation tissue. He considered the operation a partial failure. The depression in the hard palate found before the operation still existed, but he intended to make a section in a sort of a flap and push it up and fill up the cavity. He was showing the case now so as to judge fairly how difficult it was to cure these conditions.

DR. H. L. POLLOCK reported on the case of dentigerous cyst he showed at the November meeting. He had operated the previous day and removed the cyst, which had filled up the entire antrum. It had absorbed the anterior wall of the antrum and on removing the sac he found that it contained the third molar. After removing the cyst he sewed up the slit and then filled up the cavity with bismuth paste. (The specimen and some stereoscopic pictures were exhibited.)

Lingual Abscess With Report of Two Cases.*

BY JOHN A. CAVANAUGH, M. D.

DISCUSSION.

DR. L. W. DEAN, Iowa City, Iowa, said that about four weeks previously a patient came into his service with a diag-

*See page 213.

nosis of abscess of the tongue. The patient himself had made the diagnosis. He said that about ten days before he had pain on swallowing, which gradually increased, and with the pain the swelling of the tongue developed until his mouth was filled and he was unable to swallow. The patient came with the mouth partially open, the swollen tongue protruding between the incisors and the mouth could not be closed. Because of the swelling, further examination of the mouth could not be made. The breathing was through the nose. Temperature, 103; no cervical adenitis, no swelling of the salivary glands. An examination was made under general anesthetic. Palpation of the back of the tongue with the finger revealed a mass apparently the size of a small hen's egg which had no fluctuation. The mass had the same feel as a sarcoma of the base of the tongue. Using a curved bistoury, the mass was incised, with the escape of just a little pus. There was a marked edema about the epiglottis. The patient showed evidence of laryngeal obstruction during the operation, and a tracheotomy was performed. Ten hours after the operation the larynx was completely occluded, justifying the tracheotomy. The patient made a good recovery in about ten days.

Dr. Joseph Beck stated that he had had several cases of abscess of the tongue, which he reported at the last meeting of the American Medical Association. One was not strictly an abscess of the tongue, but the case was interesting in this connection. The patient was brought in by a physician who said he had been with him practically all the time for the two previous days. The patient had complained of difficulty in swallowing and breathing, and the doctor made a diagnosis of probable abscess of the tongue. Local applications of a mild astringement gave some relief, but finally the distress in breathing became so great that the patient was brought to the hospital in a cab. He tried to walk from the door to the operating room, but fell into the Doctor's arms and appeared to be struggling for air. Dr. Beck made a rapid tracheotomy, but there was no respiratory response in spite of all possible efforts. Postmortem showed an infected lingual thyroid. These cases are very rare. In a case of acute abscess of the tongue in which he made a deep incision in the tongue and evacuated the pus and gave relief from the edema which was

present, he intubated, employing a large tube that would not be expelled so easily, which he felt sure did all that a tracheotomy would have done, with less traumatism. Some of these cases of abscess of the tongue had been shown by the work of Kümmel to be chiefly syphilitic, a secondary infection or a gumma.

Dr. E. B. Wunderlich thought if pyorrhea was present in a tooth that a secondary infection from syphilis would be very likely to cause an abscess. He had had a case of this sort in which the patient died ten months later. Postmortem showed a syphilitic condition and also pyorrhea. In another case there was marked pyorrhea.

Dr. Charles H. Long cited a case which he had under observation. The patient was a woman aged fifty-four years, who had a constant burning, sticking pain in the back of the tongue. The lingual and faucial tonsils were hypertrophied; the tongue itself was not swollen, not painful on pressure. There was no cough. The patient had lost twenty pounds in weight during the last nine months. There was no record of globus hystericus. The Wassermann test was being made, but he felt that the cause of the trouble had not yet been discovered. He doubted if the term "globus hystericus" had any real place in medicine. (Later.—Report Wassermann negative. Diagnosis, without microscopic report, probable carcinoma of the tongue.)

Dr. Stanton A. Friedberg was of the opinion that etiologic factors in the acute and chronic cases were entirely different. He thought infection could very readily occur through the lingual tonsil and through the papilla. The most striking characteristic was the difficulty and inability to move the tongue. Sometimes there would be an indurated area, but seldom definite fluctuation. One other condition that might cause confusion in the acute cases was rheumatism of the tongue, where pain and stiffness were complained of on movement of the tongue.

Dr. Cavanaugh, closing, believed Dr. Dean might be correct in advising tracheotomy in acute cases. He considered it a safe procedure.

As to Dr. Beck's intubating such cases, he considered this an excellent plan if one was thoroughly skilled in the intro-

duction of the tube. Otherwise, he thought tracheotomy was preferable.

He agreed that the abscess might occur as a result of infection from pyorrhea, but it had not been definitely decided as to where the infection came from.

He believed Dr. Long was right in thinking that globus hystericus had no place in medicine and thought the use of the term was often due to ignorance of the real trouble.

Paper: Diagnosis of Intracranial Ear Complications, With Report of Cases.*

By George W. Boot, M. D.

DISCUSSION.

Dr. Joseph C. Beck thought the presentation of Dr. Boot was wonderful and that the county and city were to be congratulated on having a man on the staff of the County Hospital who would devote so much time to that institution. The cases at the County Hospital were usually so severe that very few of them recovered, because they required such extensive and experienced after-care.

He disagreed entirely with Dr. Boot's method of drainage with the rubber tube. It was obsolete and should not be employed. The abscess should be drained with rubber tissue, a sort of a cigarette drain, because the tube could fill up and become blocked with material from the abscess.

He had had the same experience as Dr. Boot in coming up to the abscess with a needle and not into it, the needle simply making an indentation and not puncturing the wall, but on postmortem the abscess was found.

He was glad to hear a new symptom of a thrombus of the longitudinal sinus, and wished Dr. Boot to state specifically regarding the other case of longitudinal sinus thrombosis, because he thought he had such a case at present in which he had made a diagnosis of typhoid fever. Nose bleed and headache were both present.

He had heard nothing mentioned about employing the symptom known as the Crow and Beck of Vienna, compression

*See page 220.

of the opposite side internal jugular and examination of the fundus oculi finding distended veins.

He thought some criticism might be expressed in making a diagnosis of periarthritis in connection with a mastoid. Why not think of a sinus thrombosis right away and explore?

DR. GEORGE E. SHAMBAUGH thought that the intracranial complications met with in connection with purulent disease of the middle ear are the most trying cases with which the otologist has to deal. The most frequent of these complications appear to be the extradural abscess, a complication which occurs so frequently with such indefinite symptoms that it is difficult to recognize clinically. It seems not unlikely that many of the cases of brain abscess owe their origin to a neglected extradural abscess which remained unrecognized until the formation of the brain abscess. He cited a couple of cases illustrating the difficulty in recognizing the extradural abscess.

One case was a woman of about fifty years of age, who consulted him several years ago, because of a persistent one sided headache which had lasted for several months. Examination of the case discovered nothing intranasally to account for the headache. She had never been a victim of migraine. There was a history of discharging ear many years before on the affected side, but she stated that she had not had any discharge from the ear for several years. Examination, however, disclosed a marginal perforation in the upper posterior quadrant, and the introduction of a cotton swab detected the slightest trace of moisture, which had, however, the characteristic odor of a bone-invading disease. On operating on the case the mastoid was found entirely sclerosed, a very much contracted antrum, and at the upper posterior angle was found a discolored tract leading off upwards and posteriorly. This tract was opened up for perhaps fully half an inch from the antrum, when a small extradural abscess was uncovered, containing only a few drops of thick creamy pus. The case made an uneventful recovery.

Another case was that of a physician, who came complaining of a persistent discharge from an ear which had been operated on for acute mastoid complication a couple of months previously. The patient seemed to be annoyed by discomfort

in the head which could hardly be described as a headache. There was a profuse purulent discharge escaping from a fistula in the original mastoid opening, with a slight temperature of not over 99.5°. In exposing the mastoid it was found that the previous operation was limited to a small passage made to the antrum. The lower half of the mastoid still remained intact and contained large pneumatic spaces filled with pus. A complete exenteration of the mastoid was performed, and it was believed that the persistence of a discharge was due especially to the involvement of the cells at the tip. The patient, however, did not get well, and the persistence of symptoms, in spite of the complete exenteration of the mastoid, made the diagnosis of some extramastoid complication probable. Another operation was undertaken, and at the upper posterior angle of the mastoid an extradural abscess was discovered, the size of a small hazelnut, and located fully three-quarters of an inch from the antrum.

It was in this particular location where the extradural abscess was most likely to be discovered, and in this connection it was well to remember that the marginal cells of the mastoid—that is, those located at a distance from the antrum—were, as a rule, much larger than the pneumatic spaces located in proximity to the antrum. This applied not only to the cells occupying the tip of the mastoid, but to those found along the posterior margin. The larger the cell involved in a suppurative process the less chance it had of getting well spontaneously.

Dr. J. Holinger asked whether in the cases that, from the later course or a postmortem, proved to be meningitis or meningeal irritation, as for example in brain abscesses, died, Dr. Boot always find Kernig and Babinski symptoms present during lifetime. (Dr. Boot said he did not.) Dr. Holinger said the reason he had asked about the Kernig and Babinski signs was this: He had operated on a lady, sixty-two years old, who complained of severe headaches and earache and absolute sleeplessness for five nights; also dizziness and discharge from a central perforation. She was very ill and resented every motion of her head. There were a number of other uncertain symptoms, among them vertical nystagmus of short duration. He considered the case suspicious of

meningitis and operated. She made a very slow recovery, during which a constant one sided headache caused a consultation to be held. A neurologist and two members of the Laryngological Society were called. One colleague considered the case suspicious of meningitis; the other and the neurologist took the standpoint that if the Babinski and Kernig were absent there was no meningitis, therefore the operation was not necessary, and said so to the house physician. In the literature of 1915 there was an extensive paper by Mygind on the findings in meningitis. He said Babinski and Kernig were not always present.

The very careful work of Dr. Boot was of importance for the indications for operations. The doctrinarian standpoint of neurologists and some colleagues might be dangerous. He emphasized that if we always waited with operations until all symptoms of meningitis were present we would lose every patient.

As to the technic of exploring for brain abscess, he mentioned that very often the pus was much too thick to go through any needle, or a needle might become clogged in going through the brain and, although it was in the abscess, no pus was evacuated. The postmortem gave the explanation. He thought the proper instrument was a small, long knife for stabbing through the dura and brain tissue. This could be followed up afterward with drainage. He believed a cross incision in the dura might lead to hernia of the brain, which could usually be avoided with the straight stab.

DR. BOOT, closing, said in regard to the case of longitudinal sinus thrombosis that the patient was a young woman, who was just about to graduate from Northwestern University. There was nothing in the past history except that she had had cystitis. She was taken sick, and her physician thought it was typhoid fever; she had headache and possibly nose bleed and her mental condition was clouded. Examination showed the drum membrane with no bulging but simply a redness showing through from the inner wall. Her mental condition became worse and she finally died. Apparently the thing was a metastatic condition from the cystitis.

With regard to the Crow-Beck symptom, he did not place much confidence in it.

As to drainage, he considered the rubber tube fully as effective as the gutta percha. In the case which was considered rheumatism, the patient had no symptoms of a mastoiditis, not even a discharge from the ear, but a history of having had a discharge a few weeks before, and under the circumstances they did not feel justified in going into the mastoid.

One thing in the cases which he had missed and which one saw referred to frequently was the stalk running up from the middle ear to the abscess.

He considered it a mistake to use a needle for draining the middle ear; something should be used that would effectively open the abscess and permit the pus to get out. There was much less risk in this than in making an opening too small to permit free drainage.

His experience with the neurologists in these cases had been disappointing. He thought Dr. Beck might recall the recent case at the County Hospital of an abscess of the nose, where a neurologist had examined the patient, and by means of the X-ray and the Abderhalden test had worked out just exactly where the growth was, but on postmortem it was not there at all.

The Babinski and Kernig had been present in most of the cases of brain abscess, but not in the meningitis cases, but he did not lay much stress on either of them.

Dr. Holinger said the cross incision was a mistake and that the incision should always be a straight one, but in one case where he had a hernia the incision had been straight and not over one centimeter long.

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